THE
LARYNGOSCOPE.

VOL. XXIII. ST. LOUIS, FEBRUARY, 1913. No. 2.

ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding that they are contributed exclusively to THE LARYNGOSCOPE.)

THE MODERN HISTORY OF ACCESSORY NASAL SINUS DISEASE.*

DR. JONATHAN WRIGHT, NEW YORK CITY.

Director of the Department of the Laboratories of the New York Post-Graduate Medical School and Hospital.

The period of my activities in laryngology covering as it does more than twenty-five years includes in its experiences the rise of interest in and the eager cultivation of our modern knowledge of diseases of the accessory sinuses of the nose. It witnessed the absurd exaggerations of notions as to the frequency with which sinus disease requires surgical intervention, the rash resort to devastating destruction of nasal structure in operative measures designed to afford relief to affections more or less trifling in themselves. It experienced the disasters, "the doctor's mistakes which the earth covers," the disappointments of too enthusiastic operators and too credulous patients. It saw reputations, world wide in the narrow domain of our specialty made out of a manual dexterity perhaps, but also out of an intrepidity of spirit which often encroached too much upon the rights of humanity and too often disregarded the precepts of conscientious professional conduct. It saw on the other hand the unselfish pursuit of knowledge, the single minded endeavor to spread its beneficent influence and make it a heritage of future medical men. A period of twenty-five years

*This article forms a part of the new matter to be included in the second edition of Dr. Wright's History of Laryngology, to be issued shortly by Lea & Febiger, the matter of the first edition having appeared in these columns. —The Editor.

had seen this slow and modest toil rewarded by the fruition of a more rational way of looking on sinus disease as usually a minor evil with which the system is often able to cope unaided or assisted only by moderate and comparatively harmless intervention. It has seen effective relief rendered in those dangerous cases of suppurative and neoplastic disease which pursued their course unchecked to a fatal issue a generation ago.

There is doubtless still much to be learned, many improvements still to be made, much enlightenment still to be gained in the study of sinus disease, but it is safe to say that the prefatory stage to the sober scientific investigation of it has passed by.

There can be no doubt that the material causes of the activities in this field of medical science had their foundations in that development of mechanical and technical art which produced the laryngoscope and the illumination of hidden recesses of the body by means of intensified gas light, electric incandescence and the mysterious powers of the actinic rays produced by atonic disintegration. Still more far-reaching in its effects was the intellectual expansion which resulted in the extension of anatomical study, both gross and microscopic, to the bony tissues and their softer linings in the nose and the adnexa.

It is unsafe to prophesy, but it seems very probable, that further advance is to be made in the future along physiological lines which must include investigations in the micro-biology and the metabolism of the nasal mucosa and its ramifications in the sinuses and to this there must be allied the consideration of the relationship which this special micro-biology and special metabolism bears to like phenomena in the general system.

We have seen how completely and exhaustively the subject of the surgical treatment of the antrum of Highmore has been dealt with in literature, largely before the nineteenth century.

After the beginning of the development of modern rhinology in the early eighties, interest was gradually aroused in the subject of accessory sinus disease. In the discussion at the meeting of the German Naturalists in 1886, the idea, traces of which we have seen in earlier literature, again arose as to the connection between sinus disease and ozenatous atrophic rhinitis. The etiology of maxillary sinus disease in the vast majority of the cases was at this time ascribed to carious teeth. Among those who accepted this view were Killian,[1] Schmiegelow,[2] and MacBride.[3]

Mikulicz[4] brought into vogue his operation of perforating the maxillary sinus with a trocar and canula from the nasal chambers, but the perforation through the alveolus still remained the more common procedure as long as the teeth were accepted as the chief factors in the etiology of suppuration.

Interest was soon aroused in America and Dr. J. H. Bryan in 1889 read a paper before the American Medical Association on the subject. Considerable had been said as to the difficulty in diagnosticating the presence of pus in the maxillary sinus and the trocar of Krause was devised for exploratory puncture, irrigation and the insufflation of iodoform and other powders.[5]

Transillumination: Another method of diagnosis attracted much more attention. Dr. Theodor Heryng[6] in 1889 urged the idea of Voltolini,—the electric transillumination of the antrum. MacBride and Vohsen both read papers on this subject at the International Congress in 1889. Even as early as this, in the discussion of Vohsen's paper Freudenthal and Heymann pointed out that transillumination is not by any means a reliable method by itself for diagnosis of sinus disease and in spite of the considerable vogue the procedure has had in rhinology this remains, twenty-five years later, the prevailing sentiment.

Latent Suppuration: Lichtwitz[7] and Jeanty[8] described cases of latent suppuration of the antrum of Highmore, pointing out that it was frequently bilateral. Writers became more cautious and critical as to the results of the treatment then in vogue, chiefly drainage through an alveolar perforation. Many cases of antrum disease alone failed to respond to this treatment, while the fact that the upper row of sinuses was furnishing the pus and the antrum was but a reservoir for it was still unknown or unappreciated.

Necrosing Ethmoiditis: As to the ethmoid cells, in 1887, Woakes[9] drew attention to a cleavage of the middle turbinated bone which he declared to be due to necrosing ethmoiditis. Although it has subsequently been shown that this apparent cleavage of the bone is often really a presentation of a polyp from beneath it, having its attachment to the hiatus semilunaris or its neighborhood, this work of Woakes created great interest in the pathological states of the ethmoidal labyrinth and led to the liveliest discussions for several years. Bosworth[10] in 1891 wrote on the various forms of disease of the ethmoid cells. Gruenwald[11] in 1892 published his well-

known brochure on nasal suppurations, special attention being drawn to the affections of the ethmoid and sphenoid cavities. Although there were a number of other articles on disease of the cavities at this time, these three contributions to the subject in England, America and Germany formed perhaps the greatest stimulus to the flood of literature of the subject which followed. Gruenwald's radical views as to occurrence, complications and treatment, Woakes' views as to the connection of ethmoiditis and nasal polypi, and still more the views of Bosworth as to ethmoiditis and the etiology of asthma and hay-fever furnished themes for animated attack and defense.

Frontal Sinus: Schaeffer[11] in 1890 had proposed to drain the frontal sinus by enlarging its communication through the infundibulum with the middle meatus. In 1891 Baumgarten,[13] Montaz,[14] Silcock,[15] Gruenwald[16] and others wrote papers on frontal sinus disease most of them counselling the trephining of the sinus externally. Among the ophthalmologists, disease of the frontal sinus es and ethmoidal cells had for a long time been known as the origin of orbital abscess[17] and many operations were performed b them in which these cavities were reached from an incision at the inner and upper angle of the orbit. Brain abscess having its origin in suppuration of the frontal sinuses was noted in 1892.[18] Lichtwitz[19] in 1893 again urged the practicability of reaching the frontal sinus through the nose, by means of probe and canula. For years this idea was discredited as dangerous and even impossible in the majority of cases by many writers.

Woakes had claimed ethmoiditis as the chief factor in the etiology of nasal polypi and Gruenwald had traced that of ozena to affections of the accessory sinuses, an idea which is still more or less prevalent among a minority of rhinologists. Among others Chiari[20] soon opposed these views, referring to 128 cases of atrophic rhinitis with ozena without sinus disease and sixty-one cases of nasal polypi without caries of the ethmoid cells. These matters as many others which engaged the attention of clinical observers in rhinology could not be intelligently discussed without a more accurate knowledge of the anatomical relations and post-mortem conditions of the accessory sinuses.

Post-mortem Examinations: In 1877 Schalle[21] had described a method of examining these cavities in the cadaver without disfiguration. This had been the great drawback to a thorough understanding of anatomical and pathological points of interest and importance

and consequently a decided hindrance to clinical activity. Since 1882 the invaluable work of Zuckerkandl[22] subsequently much enlarged, had been almost the sole guide of surgical procedure as it was subsequently the inspiration of much work in the anatomy and pathology of these regions. In 1891 Harke[23] referring to the work of Schalle, introduced an improvement in the post-mortem technic of the examination of the nasal chambers and the sinuses. Subsequently in 1895-96 Harke,[24] Dmochowski[25] and E. Fraenkel,[26] did a great deal to extend our knowledge of the anatomy, pathology and bacteriology of the nasal accessory cavities.

The discovery, made post-mortem, that such a large proportion of cases show evidence of latent disease of or purulent collections in the antrum of Highmore did much not only to establish this point, but did much also to show that patients may carry around with them for years foci of pus in the cavities of the nose without inconvenience or danger. The prevalence of epidemics of influenza throughout the civilized world during the period of growing interest in these conditions stimulated the study of them, as it gave rise to the opportunity for it. It was early recognized that this affection was the cause of the occurrence of many acute attacks and that these became the starting points of much subsequent chronic disease. While these opportunities for clinical study doubtless bore an important part in the causes which underlay the study of sinus disease, it could not have been carried to the fruition of the present day status of our knowledge, but for the continuation of the pursuit of the fundamental embryological, anatomical and pathological facts brought out in the works of Sieur and Jacobs, Killian, Onodi and others.

Von Besser[27] in 1889, had shown the presence of pyogenic organisms in the normal maxillary antrum. Dmochowski in 1895, showed that in nearly 20 per cent of post-mortem examinations of cases, dead of various diseases, there was a pathological state of the mucosa of the maxillary antrum. Like results were also obtained by Eugen Fraenkel in post-mortem examinations of a large number of cases about the same time. For many years these were the only investigations of importance which were published on the flora of the accessory sinuses.

In 1910 Turner and Lewis[28] published important papers on their bacteriology in which they showed the dominant organisms were not constant, but that pneumococci, streptococci, staphylococci, bacteriae coli, diphtheriae, influenzae were all found in various cases.

They emphasized a point, which had been occasionally mentioned by others, that when the purulent matter contained a large number of lymphocytes and when the prevailing organism was a streptococcus the chronic cases were apt to be rebellious to treatment and simple douching does not suffice. When these conditions did not prevail simple douching was often sufficient. They placed the figure of proportionate frequency of the dental factor in maxillary sinus suppuration at one third of the cases. Sobernheim,[29] in 1910, also made observations on the bacterial flora in chronic empyema of the maxillary sinus in which he came to somewhat analogous conclusions as did Turner, but found in some cases that the pus was sterile—in seven out of the twenty-five cases examined. This certainly is a surprisingly large number of negative results and conclusions from it must be accepted with caution.

HISTOLOGY: Weichselbaum and Zuckerkandl, especially Zuckerkandl, in his later editions, (1893) had made a special study of the minute anatomy of the mucosa of the accessory sinuses. Wingrave[30] showed sections of granulation tissue from the frontal sinus in 1898. Andre[31] had in 1905 written a thesis on the lymphatics of the nose, including reference to those of the accessory cavities. Gruenwald,[32] in 1910, referring to Andre's work supplemented it, and his observations go to contradict the conclusion that the lymphatic vessels of the sinuses communicate through the bony walls with those of the nasal chamber. On the contrary, they seem only to follow the mucous membrane itself. It may be remarked that familiarity with the histology of the mucosa and an appreciation of the limitations of the injection technic on which this opinion is based, may well lead us to doubt that in life infection is only thus carried by the lymph channels. There are many of them so very minute that they may well give passage to bacteria and not to injected material. However, the channels of infection along which the germs spread to new localities are still mooted points in every region of the body. It seems very probable that even the nearby spread of infection takes place in the blood current rather than by the lymph spaces. The work of Oppikofer[33] deserves notice for its extended investigation of the normal and pathological anatomical conditions of the sinuses, especially of their histological anatomy. It signalizes one of the forward steps taken in the more thorough attempts to study the actual processes of disease as revealed by the microscope, but it also deals with facts in the gross anatomy of the parts. Eschweiler[34] contributed to the histology of the mucous membrane of the frontal sinuses and Oppikofer[35] subsequently ex-

tended his work. Goetjes,[36] in 1909, devoted an essay solely to the pathological anatomy and histology of the sphenoidal sinus, having examined it in thirty-one cases post-mortem. Like previous observers he concluded that pathological changes, observed post-mortem, were as a rule acute conditions arising during the later stages of the affections of which the patients died. They often contained stomach contents. He did not agree with the statement of some of the previous observers who claimed that in the majority of the cases there had been an antecedent rhinitis and there is some reason to believe thart this is less frequently the case than in inflammatory affection of the other sinuses.

Turner,[37] in 1903, made valuable contribution to the pathology of bone-cysts in the accessory sinuses of the nose, especially with regard to those of the maxillary sinus developed from the dental embryogenetic foci. As to the cysts of the ethmoid, Onodi[38] was warranted in saying that they are anomalies in the development of the ethmoidal labyrinth. They are of a different character and origin from the cysts of the maxillary sinus. In the ethmoid it was found that the exaggerated development or pathological processes sometimes led to a cyst cavity formed out of the bulla or other small cell at the anterior end of the middle turbinate. This was occasionally found to contain pus or a glairy mucus. The cause of the cysts occasioned some discussion. Their occurrence chiefly in women is a curious phenomenon of sex pathology. Zuckerkandl, Glasmacher,[39] MacBride,[40] Knight,[41] and others noted their occurrence and various theories were advanced as to their pathogenesis, but it was not until the publication of Stieda,[42] in 1895, that it was recognized that they are the products of inflammatory action set up in the walls of pre-existing mucosa-lined cavities in the turbinated bones, whereby the osteoblasts, forming bone on the outer or convex surface and osteoclasts, absorbing it on the concave or inner surface, result in some cases in the formation of a very large cavity.[43] A very exceptional report was made by Noltenius[44] in 1895 of 37 cases of "serous disease" of the maxillary sinus in which on exploratory puncture clear fluid was washed from the antrum. The large number of cases reported by one observer attracted attention and is still unique, though a less number of cases have from time to time been reported, usually supposed to be due to cyst formation in the antrum. Cysts of the mucous membrane of the maxillary antrum were exhaustively described by Alexander[45] and the differential diagnosis of this condition from antrum empyema was the subject of a paper by Kuhnert[46] in 1897. Gerber[47]

and Shambaugh[48] in 1906 wrote of nasal cysts in the nose and maxillary sinus, their relation to the "hydrops" of the latter and their embryogenetic origin from the teeth roots. Hoffmann,[49] in 1911, extended his previous observation (1902) on cysts of the maxillary sinus in which he described his histological findings in cases of dental origin. Oppikofer[50] also contributed an exhaustive article in 1911 to the literature of dental cysts describing fully a number of cases and the histological findings, while many points in their pathogenesis are yet unexplained. He seemed to think it clear that they have their origin in inflammation of the roots and their envelopes—caries and granulation tissue representing the initial stage of their formation. There is probably a proliferation of the epithelium thus aroused, with a subsequent degeneration of the epithelium furnishing the fluid-contents of the cyst, though this is one of the points far from settled.

Teeth in the Nose: Intimately connected with the subject of dental cysts of the maxillary sinus are those anomalies of development of the teeth in the upper jaw which lead not only to cysts of their roots, but to displacement and inversion of their crowns and the wandering of the teeth through the bony walls of the superior maxillae. Naturally many of these become inhabitants of the maxillary sinus and instances of this had been noted even in prelaryngoscopic days, and early in the study of sinus disease we find many reports in literature.[51-56] A number of cases of teeth in the nose and nasal sinuses have been reported in the last two or three years.[57] Underwood[58] contributed an article in 1910 to the anatomy and pathology of the maxillary sinus in which he dealt with its embryogenetic origin in connection with the teeth, comparing conditions in various races of men.

Mucocele: Mucocele of the accessory sinuses, a rare condition which had been noted by Kuhnt was described by Avellis[59] in 1900, by Baurowicz[60] in 1901, by Bowlby[61] in 1902, by Guisez[62] in 1903 and by Onodi[63] and Moure[64] in 1905. Since then there have been a very large number of reports recorded.

Malignant Tumors: Reports of malignant tumors located in the accessory sinuses may be found scattered through general literature from almost the very beginning of medical records and I shall have to content myself with brief reference to those reports for five years following the paper of Schwenn[65] inasmuch as in laryngological literature this is the first extended reference especially confined to malignant tumors of these cavities. In 1900 he reported ten cases of malignant tumors in the accessory sinuses, two in the

maxillary, seven in the ethmoid, one in the sphenoid. Kirschner,[66] Brindel,[67] Citelli,[68] Onodi,[69] Avellis,[70] Harmer[71] and Calamida[72] were the chief reporters of cases of malignant sinus disease from 1900 to 1905, but since then many more cases may be found on record.

Choanal Polypi: Observations were made by several writers[73] who called attention to the fact that many of the nasal polypi, especially those presenting posteriorly in the choanae, had their origin from and were attached to the upper part of the maxillary sinus and in the hiatus semilunaris and not in the nasal chambers proper. Kubo proposed to operate on these by first exposing their base of attachment by the external operation (canina fossa) on the maxillary sinus. Subsequent discussion has shown that by no means all polypi are thus attached. It seems probable that this origin when existing is found only in cases of the soft edematous polypi, not of the hard growths of adolescence.[74].

Sinus Tuberculosis: Weichselbaum[75] in an article on nasal tuberculosis in 1881 referred to it as occurring in the accessory sinuses. Three or four cases of tuberculosis of the ethmoidal labyrinth have been reported[76] since then.

Rhinitis Caseosa: Cozzolino at the International Congress for Otology and Laryngology in 1889 had spoken of rhinitis caseosa or cholesteatomatosa as a disease in itself. Subsequently it became evident that it was a peculiar caseation of the retained nasal discharges excited often by the presence of a foreign body but also present in cases of pus retained in the sinuses over long periods of time.[77]

Sinus Ozena: Robertson,[78] in 1893, advocated the ideas both of Woakes as to the origin of nasal polypus and of Gruenwald as to the origin of ozena. Alexander,[79] in 1909, seems to voice the present-day opinion that the only foundation for the contention of Gruenwald that ozena is a disease of the accessory sinuses lies in the fact that atrophic rhinitis and ozena are primarily a bone disease and the accessory sinuses are involved in the changes of the mucosa producing ozena just in so far as their bony walls are involved in the general pathological process of the framework of the nasal chambers. I omit mention here of the very large number of papers and discussions which have occurred since the publication of the papers of Gruenwald in which his views are upheld, because they rest largely on clinical observations uncontrolled by post-mortem examination and unenlightened by a knowledge of histological findings.

Embryogeny of the Sinuses: The exhaustive investigations of Killian had shown the embryogenetic explanation for many anomalies in the anatomy of the frontal sinuses and these came to light in the practical observations of those practicing the various forms of frontal sinus operations.[80] Anomalies in the configuration of the frontal sinuses had been early noted. The absence of one or the other septa partial or complete dividing either into compartments or pockets often much embarrassed the operators. These anomalies occasionally led to perforations through the bone and to the wounding of the dura or even of the brain substance. Compartments were left unopened or incompletely drained and other complications were met with. Many of these difficulties were avoided after the introduction of the use of the x-ray in diagnosis. It is to the embryogenetic and the gross anatomical studies of Sieur and Jacob, Killian, Onodi and others that we must return in order to take up the thread of original observation which led to the great advance in the therapy and operative technic of sinus disease. In 1895 Killian[81] published his first articles on the anatomy of the nose of the human embryo and in these articles he extended and made more exact and definite the work of Zuckerkandl and laid the foundation for his later development of the surgery of the accessory sinuses. In England Tilley[82] published some work on the surgical anatomy of the frontal and ethmoid sinuses in which attention was drawn to their variability. In America Bryan[83] in 1895 and Myles[84] in 1896 published valuable papers in which the anatomy and surgery of the accessory sinus was discussed. Subsequently in America Coakley was an earnest and enthusiastic operator on the accessory sinuses and communicated many papers to the literature of the subject. Lathrop,[85] in 1898, published a brochure on the subject of the anatomy of the frontal and ethmoid cells, which remains with Loeb's publications America's most important contribution to the subject. Sieur and Jacob[86-87] published in 1901 an extensive and valuable work on the embryogeny of the accessory sinuses and upon the anatomical relations, which was the foundation for much subsequent work in France and America.

Anatomy of the Sinuses: At the meeting of the Society of Hungarian Ear and Throat Specialists in 1900 Onodi[88] demonstrated his anatomical preparations of the accessory sinuses which formed the basis of his later work and which has done so much to clear up many obscure points and throw light for the first time on some hitherto unknown or rather unheeded relationships of importance. His work[89] on the relationship of the posterior ethmoidal cells and

of the sphenoidal cavity to the optic nerves is especially noteworthy. The embryological studies of Killian were later supplemented by a profusely illustrated treatise[90] on the anatomy of the sinuses which with Onodi's work have formed the sources from which most of the subsequent papers have drawn their embryological and anatomical information. In 1903 Bruehl,[91] Hansen and Pluder[92] and Onodi[93] made observations on the irregularities in the anatomy of the frontal sinuses. Mosher[94] in America extended the work of Sieur and Jacob. Some attempts had been made to establish a reliable measurement by which one could know with the probe that the anterior or posterior wall of the sphenoid sinus was reached in intra-nasal operations,[95] but it was not until the paper of Onodi[96] in 1904 that the importance of the knowledge of the size, relative distances from a fixed point, etc., was fully appreciated in the surgery of the accessory sinuses. Nothing has surpassed the plates and diagrams of sections of the nose and its adnexa which he furnished in this and other papers. Especially valuable is his work on the relations of the optic nerves to the walls of the posterior ethmoidal and sphenoidal sinuses (l. c.). It may be said that these contributions of Onodi with the earlier ones of Sieur and Jacob and those of Killian form by far the most valuable additions to the still earlier work of Zuckerkandl which exist in medical literature. For five years there was not much more original work of this kind attempted. Gruenwald[97] contributed a valuable article in 1910 to the literature of the anatomy of the sinuses from their embryogenetic standpoint as derivatives of the hiatus semilunaris illustrated by clinical phenomena as observed in practice, pointing out that the proximity of these cavities in the embryo to the lateral nasal furrow serve as an explanation of inflammatory and teratological processes in the maxillary sinus and in the regions lying between the eye and nose. The same subject was treated by Schaeffer[98] at this time. Onodi,[99] in 1911, published a brochure with his usual excellence of illustration and of detail on the nasal sinuses of children. A number of cases of empyema of the sinuses in children had been observed. Canestro[100] reported in 1911 empyema of the maxillary sinus in a child, 26 days old, and collected other reports in literature and made some anatomical studies of the accessory sinuses in infants which made it evident that, though rarely, the sinuses may be the seat of disease before they are fully developed. Loeb at the International Laryngological Congress (1911) and elsewhere, detailed his investigations of the cubic capacity and square surface of the accessory sinuses.

These were the beginnings and the course of that anatomical and pathological inquiry, incompletely detailed here it is true, which has been devoted to the study of sinus disease, acting at first as a stimulus and more recently as a guide to surgical procedure. Certain advances in the methods of diagnosis must now be alluded to though it is quite impossible to find space to set forth fully the evolution of that diagnostic acumen which has become the possession of all competent rhinologists. Clinical experience has played the most important part, yet it is only possible here to refer to the chief aids in the clinical study of sinus disease which have made diagnosis more accurate.

Roentgenology in Sinus Disease: I have already referred as fully as space allows to the early history of transillumination. In natural sequence we come to speak of roentgenology in the service of the study of sinus disease. On September 24, 1896, Max Scheier[101] made an address before the Society of German Scientists and Physicians at Frankfort on the value of the Roentgen Rays in the diagnosis of affections of the nose and throat. The outlines of the accessory sinuses can hardly be made out in his plates but sufficient was demonstrated to act as an incentive for future endeavor. It has resulted, for the diagnosis of accessory sinus disease, in the development of one of the most valuable aids we have in ascertaining the limits of purulent involvement of the sinuses. In connection with other adjuvants, in spite of much disappointment inevitable on the advent of a new device in medicine due to exaggerated claims, it seems to have established itself as a much more valuable procedure than transillumination which also had its day of exaggerated enthusiasm and is still after judicious criticism indispensable to the armamentarium of the rhinologist. It was, however, a number of years before this aid in the diagnosis reached a stage of practical value. The complicated labyrinth of cavities and their bony walls which go to make up the anatomy of the nasal chambers and their adnexa presented a problem of very great difficulty to the roentgenologist. Many efforts, most of them too technical for detail here, were made to overcome these obstacles. In 1903 Weil proposed the introduction into the maxillary sinus of substances forming a shadow with the x-rays in order to demonstrate its anatomical configuration and pathological state. This proved of little assistance and the difficulty of introduction and withdrawal of such powders has made it impracticable and unwise. Some cases were subsequently reported where such material acted as an irritating foreign substance in the cavities. The chief im-

provements in skiagraphy have been the technical ones of a more efficient apparatus both electric and photographic. Coakley[102] in America recognized the value of skiagraphy in the diagnosis and differentiation of separate sinus affections and was active in developing its application to sinus diagnosis. Herzfeld[103] in criticism of the work of Kuettner,[104] an atlas published in 1908 with 20 plates, brought out a discussion in the Berlin Laryngological Society (December 11, 1908) whereby it was apparent that by this time the consensus of opinion was that roentgenology had furnished a valuable aid in the diagnosis of sinus disease, but the short-comings and unreliability of it as an exclusive indication for operation, or even as an indication of the existence of disease, were still very great. In this and subsequent meetings Peyser, Killian, Albrecht and others expressed themselves to this effect. Although Albrecht's[105] reproductions marks a distinct advance over former work in Germany, his plates have been surpassed by other workers in America. Caldwell[106] had, in 1908, far surpassed all competitors, but the recent exhibition of stereoscopic plates, giving the perspective of relationship of the sinuses to one another seems to have brought the art to its acme of development.[107] Haike[108] published a paper in 1910 upon the skiagraphic examination of the accessory sinuses of children whereby some light was gained in the knowledge of their development and in the diagnosis of the pathological conditions which occasionally are present in them. A number of rhinologists used the x-ray in the treatment of affections, other than malignant tumors, in the accessory sinuses, but without success,[109] so far as one can judge from the reports and the fact that the procedure has been little used and has received little mention. There have been some favorable reports of the x-ray treatment of malignant tumors in the sinuses.[110]

Diagnostic Irrigation: Krause,[111] Lichtwitz, Myles and Onodi had devised curved trocars and canulae for perforation of the walls of the maxillary sinus above or below the middle turbinate for purposes of irrigation. As early as 1896 Killian[112] made use of these in detecting the presence of pus in the antrum of Highmore by washing it out of the hiatus semilunaris by the stream of fluid introduced through the canula.

Negative Pressure in Diagnosis: Seifert[113] and Rethi[114] by using the Politzer bag for inflation of the ear in such a manner that on the expansion of the bulb a negative pressure is exerted in the nose, initiated a method of diagnosis of accessory sinus disease which depends on the suction of pus from the recesses to the nasal pass-

ages where its visibility furnishes a guide to the sinus contents. Sondermann[115] and Spiess[116] devised more effective apparatus for producing negative pressure in the nasal chambers. This procedure they claimed to have a therapeutic value in the treatment of certain nasal affections, but this has not been sustained. Its chief value remains the diagnostic one. By sucking the contents out of the openings of the accessory sinuses into the middle meatus where it can be seen in rhinoscopy permits the observer to detect latent suppuration of the cavities. Of course it has not always proved efficacious in accomplishing its purpose, but it has often proved useful in avoiding the necessity for perforating the maxillary sinus with trocar and canula and washing out the contents of the cavity for diagnostic purposes,—a painful or at least an unpleasant proceeding and one not always unattended by danger.[117] Claus[118] reported four cases of death from puncture and washing out the maxillary sinus, one at least apparently from the introduction of air into a vein. Various contrivances of a suction pump driven by electricity or otherwise have thus become very useful additions to the rhinologist's armamentarium.

Endoscope: As early as 1902-03[119] attempts were made to invent an endoscope by means of which closer and more minute inspection might be made of the walls of the sinuses when introduced in the nose or through artificial openings in the sinuses themselves, especially the maxillary. More recently Tovolgyi[120] has devised an instrument by means of which the maxillary antrum is punctured and through the endoscopic canula its walls inspected. He called it an "antroskoptrocar."

Frontal Sinus Operations: Ogston[121] in referring to his own attempts to do so had declared in 1884 that there was no possibility of introducing a probe into the frontal sinus from the passages below. Subsequent work slowly but finally fully demonstrated the essential error of this assumption. I have already referred to the early proposition of Schaeffer and Lichtwitz to open the frontal sinus through the nose. This did not meet with favor at the time, though Winckler[122] in 1893 did much to show the surgical relations of the frontal sinus with the upper nasal passages were such as to suggest its practicability. In this he was supported by Scheier.[123] Very early it was recognized[124] that acute frontal sinus inflammations in the great majority of cases recover spontaneously and that it is necessary to distinguish carefully in this respect the indications for operation, but when an operation is necessary the whole drift of opinion for ten years was toward gaining access to the sinus by

means of an external operation. Tilley[125] in 1896 made a study of the surgical anatomy of the frontal sinus and urged this route. In many subsequent papers and at almost every meeting of laryngologists in Great Britain and in many elsewhere, this earnest worker has contributed to the literature of the subject. Cases of brain abscess complicating frontal sinus suppuration began to be frequently reported.[127] In France Luc[128] was active and influential in the development of knowledge of accessory sinus disease and he also had occasion to note[129] the occurrence of meningeal infection after an operation on a tumor of the frontal sinus. In 1884 Ogston (l. c.) had operated on the frontal sinus by an angular incision, a vertical one along the wrinkles between the eyebrows meeting a horizontal incision parallel to the wrinkles of the brow. Skin and periosteum being raised he applied a trephine to the bone and made a large enough opening to expose the contents of the sinus. This was only practiced in one case. He then made an incision 1½ inches in length commencing at the root of the nose and extending upward over the nasal eminence of the frontal bone in the central line of the brow. Luc's operation was similar and the method is sometimes referred to as the Ogston-Luc operation. He, however, employed curettage and then inserted an intra-nasal drain. This procedure was practiced in London by Waggett[130] and others. This operation Luc and many others abandoned for the operation of Killian. The operation of Kuhnt[131] by removing the front wall of the sinus produced such deformity that operators and patients alike shrank from the disfigurement. This the operation of Killian largely avoided. In 1895 he described[132] and in 1902 he further elaborated[133] his method of incision through the eyebrow and preservation of the upper orbital arch whereby complete exposure of the frontal sinus was obtained and less disfigurement was the result. By prolonging the incision down beyond the inner angle of the orbit a field of bone was included in a flap turned downward and outward which could be turned back into place after curettage and breaking down of carious bone and septa obstructing drainage in all the upper accessory cavities of the nose, the frontal, the anterior and posterior ethmoidal and the sphenoidal sinuses. Packing the cavities and irrigation practiced through drains left in the external wound could be carried out. There can be no doubt, that for the external operation this initiated a technic far superior to any hitherto practiced. In the same year (1895) Gussenbauer[134] published an account of his operation which consisted in a temporary resection of the nasal framework in order to expose the frontal,

ethmoidal, or orbital cavities. A curved incision starting over each eyebrow ran down along each side of the nose and joined at the lower level of the nasal bones. The skin and nasal bones were turned up on the forehead in such manner as to expose the anterior part of the ethmoidal region and the frontal sinus. Many other external operations were suggested and performed. A resume of some of this work may be found in Bosworth's second volume of "Diseases of the Nose and Throat" in the chapter on the external operations on the nose (1889) which gives a good idea of the methods prevailing at that time and will serve to indicate the advances made in the development of the more rational and conservative methods at present (1913) employed. These were the methods which the operation of Killian largely displaced.

At the meeting of the British Medical Association, in 1899, much time was taken up in the laryngological section by English, American and French authors in the discussion of frontal and ethmoidal sinus suppuration. Charters-Symonds, Moure, Luc, Tilley and Logan Turner contributed papers of value. In that of Tilley the complication of brain abscess following operation was given prominence while Turner reported examinations by means of transillumination which revealed many apparent anomalies of the frontal sinus. While the operation of Killian has been modified in many ways, essentially his method has, until lately, been the prevailing practice. In 1910 and 1911 Broeckaert,[135] Ritter,[136] Jacques[137] and Luc[138] reported favorably on the results of operations in which the whole anterior frontal wall is preserved and only the lower or orbital wall of the sinus is removed. This modification was adopted chiefly because, even with the preservation of the orbital arch, the removal of bone above it often leads to deep depressions, to fill out which many operators subsequently resorted to the injection of paraffin.

At the meeting of the American Laryngological Association in 1905, there was a long and valuable symposium and general discussion of sinus disease and the operations for its alleviation. In a separate paper, however, Ingals reported a series of cases beginning in 1893, in which he had treated the frontal sinus through the infundibulum leaving a gold tube in some of the cases for continual irrigation. Casselberry mentioned having employed a burr to enlarge the natural opening. These cases were selected, for naturally septa in the frontal sinus would defeat the drainage, and in some the natural opening was not successfully entered. The use of the unguarded nasal burr being considered dangerous, in 1907 and 1908,

Ingals[139] and Skillern[140] described a device by which a probe was first introduced in the frontal sinus then an electric trephine was introduced over it and an enlargement of the duct obtained in such a manner that neither the lateral walls nor the roof of the frontal sinus beyond the probe could be damaged. Worthington[141] also made use of this method, and by 1910, Ingals[142] was able to claim a cure of the suppuration of 95 per cent of the cases in from six weeks to six months. By 1911, this route of entering the frontal sinus had been used by many operators. Ingals had proved the position of the introduced probe by the use of the x-rays. Sieur and Rouvillois[143] again made an anatomical study demonstrating on the cadaver the possibility of reaching the frontal sinus by the intra-nasal channel. Vacher,[144] who had previously advocated the treatment of the frontal sinus suppuration by the intra-nasal method again referred to the subject in 1911, in France, while in Germany, Halle,[145] using a protected, electrically-driven burr, reported having operated on nineteen persons in this way. A shield was held behind and internal to the burr to protect the orbital plate of the ethmoid. It was freely admitted that these internal operations on the frontal sinus were not suitable for all cases. Vacher's internal method of operating on the frontal sinus met with considerable criticism in France,[146] as did the similar propositions of Halle in Germany and of Ingals in America; but there is no doubt that in selected cases it has become the operation of choice with many rhinologists.

Maxillary Sinus Operations: It is difficult to observe any chronological sequence in a description of the operations on the maxillary sinus in the period here dealt with. We have seen, however, in the eighteenth century the antrum had been frequently opened, usually but not always through the dental alveoli. Krause, Lichtwitz, Myles, Onodi and others had followed the lead of Mikulicz in perforating by trocar the nasal wall of the antrum above or below the inferior turbinate, and Onodi,[147] in 1903, had devised a trocar for entering and dilating the natural opening in the middle meatus. Jansen,[148] after referring to the reports of Hartmann,[149] who, in 1899, claimed to have cured a large proportion of cases of antrum suppuration by irrigation through the hiatus semilunaris and to the poor results obtained by methods of operations which were really only those of earlier pre-rhinoscopic authors revived and to which I have referred in foregoing pages, described a more thorough opening of the sinus through the facial wall of the upper jaw. He did not in this paper inaugurate any absolutely new procedure, but it was the first of his publications which subsequently developed his

method of attacking the ethmoidal and sphenoidal sinuses through this avenue of the maxillary sinus. It also drew attention more pressingly to the fact that pus in the antrum owed its origin often to suppuration in the frontal, ethmoidal and sphenoidal cavities, and explained the reasons why so often disappointment followed operations for the relief of pus in the maxillary sinus above. His proposal to turn the mucous membrane formerly covering the excised bone into the antrum was subsequently adopted by other operators, where disease or curettage in the treatment of it had destroyed the antral mucosa. Berens,[150] in America, practiced this method in a large number of cases. In America, in 1893, Caldwell[151] described a method of operating on the maxillary sinus, which consisted in opening the antrum in the canine fossa and through this making an opening in the nose. Later this operation was practiced by Spicer[152] in England, and by Luc,[153] in France, and has generally been known as the Caldwell-Luc operation. Kuester had, in 1899, advocated the extensive opening of the external bony walls of the antrum in conformity with the extreme doctrines for all suppurating cavities. Partsch[154] and Scheinmann had advocated the use of a trephine. Others used the chisel. All operators used tampons for a shorter or longer time after operations. Boenninghaus[155] followed the technic of Caldwell-Luc, but turned into the antrum, as Jansen had recommended for the mucosa of the facial wall, the mucosa of the nasal chamber covering the bone-piece he removed, which was often very large. Packing the antral cavity only he thus held the mucosa in place. Luc,[156] in 1900, published his lectures on suppuration in the accessory sinuses of the nose, which is a fair representation of the best work in France at the time. All operators on the maxillary sinus met defeat in their results owing to the prompt closure of any opening made through the bony walls, unless an obturator was worn as in the old Cooper operation and the later Jansen operation above referred to.[157] The perforation would not remain open until the discharge ceased. To avert this and avoid the irritation of an obturator or a metal tube drain, the Caldwell-Luc operation was extended by some operators to the complete removal of the naso-antral wall, making one large cavity out of the antrum and the inferior and middle nasal meatus. Alsen[158] and Gerber, in 1901, carried out this method. Denker,[159] in 1905, extended the technic of Luc in such a way that the entire inner bony wall of the maxillary antrum was removed and the mucous membrane of its nasal surface preserved so that by means of a tampon it could be made to line the denuded bony floor of the antrum. He adopted

some of the technic of Jansen, of Kretschmann,[160] Boenninghaus, Friedrich[161] and Boerger.[162] Freer[163] and others have succeeded in removing the greater part of the inner wall of the antrum, including the inferior turbinated bone by intra-nasal operation, thus accomplishing the object the Caldwell-Luc was designed to attain. While its possibility was demonstrated, this difficult operation has not found favor in competition with the procedure of Luc until recently, but in the last two or three years this method has been largely practiced.[154] Whether by the extensive operation of Denker or by that of Freer and others, the whole naso-antral wall with the inferior turbinate or a large part of these structures being removed, it was soon found that the walls of this cavity became encrusted with dried secretions and continual irrigation was necessary for years. This was another reason for the use of a more rational surgical treatment of sinus disease. Gradually the object to be attained was seen to be to locate the bony cell or cells in the upper nasal labyrinth, which was the origin of the pus in the lower meatus and the antrum itself and to establish a drainage by removal of the lower bony wall or the obstructing soft parts. Jansen sought to accomplish this through the antrum by scraping away the ethmoidal cell wall at the upper part and the sphenoid sinus wall at the upper and posterior angle of the antrum. The technical difficulties were great and the results in the hands of other operators were not brilliant. Cases were constantly being reported in which the sphenoidal sinus was opened through the nose, curetted, drainage established and the case cured without the extensive and difficult technic of Jansen, as, for instance, in the report of Flatau.[165] For the ethmoidal and sphenoidal cells this, chiefly through the demonstrations of Hajek[166] has finally become in more recent years the operation of choice. To obviate the drawbacks which the experience of years has demonstrated in the results of creating these large cavities they have been much limited of late. Hirsch,[167] in 1911, described an operation whereby he sought to overcome the evil effects of the destruction of the inner wall of the maxillary sinus in those operations on it where the nasal chambers are made to communicate widely and permanently with it. The inferior turbinate was temporarily resected, a wide opening established beneath it and then it was fastened again in place. Still more formidable operations grew out of the procedure of Rouge.[168] In 1873 he had suggested an operation consisting in an incision beneath the upper lip and a separation of the septal cartilage from its articulation with the superior maxillary bones, thus gaining larger access to the interior of the nose than could be obtained through

the natural opening. Later this technic was supplemented by the procedure of Partsch[169] and Loewe,[170] which consisted further in a severance of the whole septum and of the outer and inner, anterior and posterior walls of each antrum from the palatal arch so that the whole of the latter could be depressed on the tongue and a much larger access thus obtained to all the sinuses, but especially to the sphenoid region and the posterior ethmoidal cells, chiefly designed to facilitate the removal of post-nasal tumors. The hemorrhages occurring in these formidable procedures prevented their general adoption, though they have occasionally been reported. Bardenhauer's modification of the Rouge operation, in 1898, consisted chiefly in a very much wider separation of the soft parts from the anterior surfaces of the bones of the face and even the dislocation of the nasal bones to gain free access to the frontal sinuses as well as to the maxillary and ethmoid. Goris,[171] in France, was an advocate of this technic and for a number of years was active in the performance of many serious operations about the nose and its sinuses. Moure,[172] in 1896, drew attention to purulent infections of the maxillary sinus in children as having some relation to the eruption of the teeth at a time when the sinus had become completely developed, but d'Arcy Power,[173] 1897, claimed to have observed maxillary sinus empyema in a child only eight weeks old. Mayer,[174] 1901, reported a case in a child 2½ years old. Coffin,[175] in reporting four cases, alluded to suppuration in the maxillary sinus operated on when the child was six months old. I have referred to the recent work of Haike, Onodi and of Canestro on suppuration of the accessory sinuses in children, the latter reporting a case in a child, 26 days old.

Ethmoid Cells: The claim of Schadle[176] that affections of the maxillary sinus are often a factor in the etiology of hay-fever has received no confirmation or recognition. These reflexes had been noticed by Bosworth[177] as due to ethmoid disease. His enthusiasm for intra-nasal operation in the eradication of nasal polypi and their bony attachments in the ethmoid accomplished much in arousing interest in ethmoidal disease in America, though his contention that the latter is a primal factor in the etiology of asthma and hay-fever has not, as a rule, received the support of his colleagues. Everywhere in intra-nasal operations on the ethmoid, removal of the middle turbinate in whole or in part and often of the lower turbinate was a prelude to the various surgical attacks on the ethmoidal cells and the improvement in the surgical armamentarium for this purpose has been very great. Gruenwald[178] devised a number of

curettes, chisels and rongeurs by means of which access to and treatment of the accessory sinuses were greatly facilitated. These are set forth in his text-book and in many previous communications on intra-nasal surgery. Hajek (l. c.) publishing his first edition in 1899, has, of late years (1899-1909) unquestionably been the most influential writer in developing the technic and in insisting on the intra-nasal route for operations on the ethmoid cells. The operations of Jansen, of Killian and of Rouge with their innumerable modifications represent the operative technic in reaching the ethmoid by the extra-nasal route, but involving, as they do, the preliminary invasion of the frontal or maxillary sinuses, they have been for the most part practiced in cases in which these cavities were themselves affected. As intra-nasal methods have with increasing frequency been applied to these, the ethmoid technic as developed by Hajek and others has come more and more into vogue. Uffenorde,[179] in 1907, wrote a monograph on the affections of the ethmoid cells advocating the external in preference to the internal methods of operating, but the drift has been away from this advice for a number of years.

Sphenoid Sinus and the Hypophysis: Clearing away the ethmoidal labyrinth either by intra-nasal operation or by the way of the antrum or frontal sinus is naturally followed by the exposure of the sphenoidal. We have noted the relationship which Onodi shows to exist between the posterior ethmoidal cells and the sphenoidal cavity. While this is fairly brought out in the earlier work of Zuckerkandl, it was studied later much more in detail in connection with the operations on these cavities not only to evacuate their contents, but to furnish a route to operations on the hypophysis cerebri recently undertaken. The very great interest excited in the phenomena presented, physiologically and pathologically, by the ductless glands inevitably led to the development of surgical attacks on the hypophysis. The way of reaching the sphenoidal sinuses through the nose had already been pointed out in the work of Zuckerkandl, Killian, Tilley, Coakley, Gruenwald, Jansen and others to whom I have referred. These are reviewed with the writings of others, by Skillern.[180] In 1906, Horsley[181] had reported his method of making externally a lateral incision and lifting the middle cerebral lobe and thereby reaching the pineal gland without entering the nasal cavities. Caton and Paul,[182] in 1893, had first proposed this method. Moskowitz,[183] Schmiegelow,[184] Hirsch,[185] Goris,[186] West[187] operated through the nose, the latter as well as Skillern giving a good bibliography of the subject. Loewe[188] and Vorschuetz,[189] operating by

the Partsch method, extended it in such a way as to include "decortication of the face," i. e., removing from the soft parts, after reflecting them upward, the facial and nasal wall of the antrum and the ascending ramus of the superior maxilla. Kuehn,[190] in 1911, proposed to reach the sphenoid sinus and through it the hypophysis by way of the mouth, chiselling some of the hard palate, some of the vomer and the pterygoid process, and carrying the soft palate with them backward in the pharynx. These were to be stitched back in place after the evacuation of the sphenoid. Hypophyseal surgery was discussed in 1911 at the meeting of the American Laryngological Association, and Onodi[191] made some very interesting remarks on the subject elesewhere.

Complications of Accessory Sinus Disease: It remains to say a few words of the complications of accessory sinus disease which were reported from time to time as they had an important influence on the development of the diagnosis and operative therapy. They were chiefly those of the contents of the neighboring cavities of the orbit and the cranium. In 1876, Hermann Knapp[192] reported a case of orbital abscess in which the cavity involved the anterior ethmoidal cells, in which apparently the trouble originated. Subsequently this author made many contributions to the same subject,[193] reporting, in 1880, the invasion of the orbit from an empyema of the frontal sinus. Others also noted such cases[194] before the publication of Ziem's paper. In 1893, Ziem[195] drew attention to the intimate connection between orbital and ocular lesions and disease of the upper accessory sinuses. These observations, though forgotten for many years, have of late been expanded by the published experiences of others, especially by the valuable anatomical work of Onodi.[196] Shortly after the appearance of Ziem's article, Kuhnt (l. c.) from the standpoint of the ophthalmologist studied the affections of the frontal sinus in their relation to eye disease. In France it was treated by Roehmer.[197] Axenfeld,[198] in 1902, wrote of the orbital complications of disease of the frontal and ethmoidal sinuses. After four or five years the number of articles and treatises on the relationship between accessory nasal sinus disease and ocular orbital and optic nerve affections was very large.[199-205] A large number of reports of ocular and orbital complications were made in 1911.[206]

As early as 1895, Dreyfuss[207] could collect reports of many cases of cerebral disease resulting from suppuration in the nasal sinuses, twenty-two being due to frontal sinus disease, the posterior wall of the frontal sinus being perforated in many of them by an osteitis. It has since been more fully recognized how apt the inflammation of

the soft parts is to spread to the bony walls. Craig,[208] in 1900, published a collection of cases from literature of this nature, though he seemed to find reason to believe that maxillary antrum suppuration was more commonly the starting-point for cerebral inflammation than that of the frontal,—a view which other investigators have for the most part not supported. St. Clair Thomson[209] also wrote on the subject. Onodi,[210] in 1911, collected statistics of 106 cases in which cerebral abscess had occurred as a complication of accessory sinus disease and in these 106 cases the frontal sinus was involved in eighty-two, the ethmoid in eleven, the maxillary sinus in four cases and the sphenoid in one. It was recognized that an osteitis was apt to accompany affections of the frontal sinus and the complications which experience revealed in these cases seemed an indication, to some authors, for operation in every case of frontal sinusitis. To others it seemed that these operations themselves were in many cases apt to precipitate rather than to avoid the dangers arising from them. In Gerber's book[211] we find an example of the former view, while in Kuettner's review[212] of it we find set forth the conservative opinion which seems likely to prevail in the future.

Trend to Conservatism in Operation: Weil,[213] in 1896, not only expressed the opinion that nearly all inflammatory affections of an acute nature tended to spontaneous recovery, but that these, as well as the chronic cases, were due to an extension from acute inflammatory conditions of the nasal mucosa. He and many who took part in the discussion of his paper at this time in Vienna expressed a preference for treating maxillary sinus disease through the nasal orifice of the antrum, or through some enlargement of it. The difficulty, and, in many cases, the impossibility of this technic subsequently became evident, but in Vienna, operative procedures on the accessory sinuses, have always been markedly under the influence of Hajek's sane and painstaking methods. Many points in the experience hitherto gained came out in the discussion on accessory sinus disease at the International Medical Congress at London, in 1897. In the same year a similar discussion followed the presentation of a case by Bryan at the meeting of the American Laryngological Association. Killian[214] recommended, in 1909, a method of treatment of acute accessory sinus disease by the application of heat and light furnished by an air-tight box supplied with electric lights of high candle-power, a sort of sweat-box supplemented by high intensity light, invented by Bruenings. This was said to relieve the pain and promote the flow of secretion and hasten the natural process of

cure. At this meeting he and others expressed opinions favorable to a more conservative attitude in questions of operative procedure, but long before this it had become evident to conservative men that the enthusiasm for extensive and destructive operations on the accessory sinuses was being carried to a dangerous extreme. In 1901 Sir Felix Semon[215] warned his confreres against this tendency in England. A similar protest[216] in America, in 1905, was the consequence of this continued lack of critical differentiation in the selection of cases for operation. Shortly after this there were signs of a more rational judgment, beginning to be brought to bear on the subject. Kuettner[217] on many occasions maintained the same conservative ground in Germany. Hajek's[218] conservative stand in 1909, in Vienna, in regard to the treatment of accessory sinus suppuration is a further instance of the rational position which has finally, after twenty years, been established among laryngologists. Taken together with Semon's early and wise words in London, and Kuettner's in Berlin, it is especially strengthened by the general tone of moderation which has found its way into most, if not into all of the recent works on the subject. At this meeting, much of the time was taken up with the discussion of this aspect of the subject and with the significant frequency of cerebral complications in accessory sinus troubles which have been treated surgically. An interesting discussion of the subject took place at the meeting of the American Laryngological Association, 1903. For the ten years previous to this it had been often urged that the nasal sinus affections could be traced in their origin to inflammation within the nasal chambers. This was emphasized and the remark was made by Freeman that the sinus affection, when unilateral, was nearly always on the side of the nose presenting in the meati the greatest amount of obstruction. It was not until the resort to intra-nasal operation in opening the sinuses became more common that the necessity was felt for correcting these intra-nasal causes of sinus disease. This has grown into a weighty argument against the external operation, when it is possible to avoid it. While there has been reason to suppose that many of the cases with meningeal symptoms as a result of accessory sinus disease, reported occaionally as cured after operation on the nasal cavity, were really cases with cerebral symptoms of septicemia, there are some reports in which the evidence of an actual purulent meningitis existing, yet cured, is very strong.[219] There still seems good reason to suppose that in the vast majority of the cases such a fortunate result does not obtain, except in the event of a cerebral abscess opportunely detected and drained through

an opening in the walls of the sinuses. As an example of the extent to which radical operations were advocated for accessory sinus disease by some writers, one may cite the brochure of Uffenorde,[220] published in 1907 shortly after the movement in criticism of operative radicalism had gained headway. His declaration that every conservative method was fruitless, even harmful, was promptly criticised. Since about this date there can be clearly recognized a general tendency among rhinologists to abandon access by external routes to the accessory sinuses and to adopt those methods, the technic of which has been greatly advanced, by which openings are made from the nasal chambers not only into the antrum of Highmore and the sphenoidal and ethmoidal cells, but into the frontal sinuses as well. Not a little of this change of method, as well as the chief element in the drift towards more conservatism was due to the experience with results of the more thorough of the external operations. Secretion of pus was found to persist in a very large number of cases and though other symptoms, especially pain, were often relieved, dangerous and widely mutilating operations began to seem hardly justified in a class of cases, eagerly accepted at first as suitable for operation. It was realized then that the imperfect results attendant on less radical methods at first were not always due to conservatism. With the improved intra-nasal technic, there was less cause for criticism as to imperfect drainage being secured. That there is still a respectable number of cases in which the Caldwell-Luc, the Killian and the Jansen operations are considered justified is almost universally recognized.

Local Anesthesia in Sinus Operations: While cocain was at first used for intra-nasal operations only, from time to time propositions had been made to operate externally on the accessory sinuses under local anesthesia. In 1911, Braun[221] proposed and carried out operations on the sinuses under anesthesia obtained by the injection of the derivatives of cocain into branches of the trigeminus nerve at its facial points of emergence from the bones. Killian,[222] in 1912, spoke well of it when applied to the Gasserian ganglion. Such a radical operator as Uffenorde[223] was a convert to this method.

Vaccines: As in other suppurative processes, the introduction of vaccines, due to the observation and therapeutic claims of Sir Almoth Wright, may be noted at this time (1910) in the therapy of the accessory sinuses.[224]

BIBLIOGRAPHY.

1. *Monatschrift f. Ohrenheilkunde*, 10-11, 1887.
2. Hospitals Tidende, February, 1888.
3. *Edin. Med. Journ.*, April, 1888.
4. *Archiv. f. Klin. Chirurg*, Heft 3, 1887, p. 626.
5. Moritz Schmidt; *Berliner Klinische Wochenschrift*, No. 50, 1888. Friedlander: *Berliner Klinische Wochenschrift*, No. 37, 1889.
6. Heryng: *Berliner Klinische Wochenschrift*, No. 35, 1889.
7. Lichtwitz: *Prager Medizinische Wochenschrift*, 15-16, 1892.
8. Jeanty: Traite sur l'empyeme latente, etc., 1891.
9. Nasal Polypus, 1887.
10. Bosworth: *New York Medical Journal*, November 7, 1891.
11. Gruenwald: Die Lehre von der Naseneiterungen, etc., 1892.
12. Schaeffer: *Deutsche Medizinische Wochenschrift*, No. 41, 1890.
13. Baumgarten: *Pest. Medizinische Chirurgische Presse*, 10, 1891.
14. Montaz: Des Sinus frontaux et de leur trepanation, 1891.
15. Silcock: *British Medical Journal*, April 25, 1891.
16. Gruenwald: *Muenchener Medizinische Wochenschrift*, No. 40-41, 1891.
17. Guillemain: Etude sur les absces des sinus frontaux, 1892.
18. Bericht des Allgemeinen Krankenhaus in Wien fuer, 1890. *Wiener Medizinische Blaetter*, No. 13, 1892.
19. Lichtwitz: *Annales des Maladies de l'Oreille*, p. 132, 1893.
20. Chiari: *Wiener Klinische Wochenschrift*, No. 14, 1894.
21. Schalle: *Virchow's Archiv*, No. 71, p. 206.
22. Normale und Pathologische Anatomie der Nasenhoehle und Ihrer Pneumatischen Anhaenge, 1882, 1892, 1893.
23. Harke: *Virchow's Archiv*, No. 125, p. 410.
24. Harke: Beitraege zur Pathologie und Therapie der Oberen Athmungswege, etc., 1895.
25. Dmochowski: *Archiv fuer Laryngologie und Rhinologie*, Bd. 3, Heft 3, p. 255, 1895.
26. E. Fraenkel: *Virchow's Archiv*, Bd. 143, p. 42, 1896.
27. Von Besser: *Beitraege zur Pathologische Anatomie*, No. 6, 1889, p. 333.
28. Turner and Lewis: *Edinburg Medical Journal*, April, 1910. Lewis: *Journal of Pathology and Bacteriology*, July, 1911.
29. Sobernheim: *Archiv fuer Laryngologie und Rhinologie*, etc., Bd. 23, Heft 2, 1910.
30. Wingrave: London Laryngological Society, April 13, 1898.
31. Andre: Contribution a l'etude des lymphatiques du nez et des fosses nasales—These de Paris, 1905.
32. Gruenwald: *Archiv fuer Laryngologie und Rhinologie*, Bd. 23, Heft 1, p. 1, 1910.
33. *Archiv fuer Laryngologie und Rhinologie*, No. 19, p. 28, 1907.
34. Eschweiler: *Archiv fuer Laryngologie und Rhinologie*, Bd. 17, p. 437, 1905.
35. Oppikofer: *Archiv fuer Laryngologie und Rhinologie*, Bd. 21, Heft 3, 1909.
36. Goetjes: *Archiv fuer Laryngologie und Rhinologie*, Bd. 22, p. 129, 1909.
37. Turner: *Edinburg Medical Journal*, 1903; The Laryngoscope, November, 1904.
38. Onodi: *Archiv fuer Laryngologie und Rhinologie*, Bd. 15, p. 306, 1903.
39. Glasmacher: *Berliner Klinische Wochenschrift*, 1884.
40. MacBride: *British Medical Journal*, p. 116, 1888.
41. Knight: Transactions American Laryngological Ass'n., 1891.
42. Stieda: *Archiv fuer Laryngologie*, Bd. 3, p. 359, 1895.

43. WRIGHT: *New York Medical Journal*, June 27, 1896. WRIGHT: *American Journal of the Medical Sciences*, May, 1909.
44. NOLTENIUS: *Monatschrift fuer Ohrenheilkunde*, No .4, 1895.
45. ALEXANDER: Berliner Laryngologische Gesellschaft, October 3, 1896.
46. KUHNERT: Archiv fuer Laryngologie und Rhinologie, Bd. 7, Heft 1, 1897.
47. GERBER: Archiv fuer Laryngologie und Rhinologie, Bd. 16, p. 502, 1906.
48. SHAMBAUGH: THE LARYNGOSCOPE, July, 1906.
49. HOFFMANN: *Zeitschrift fuer Laryngologie und Rhinologie*, No. 3, p. 467, 1911.
50. OPPIKOFER: Verhandlung des Vereins deutsche Laryngologen, 1911. *Archiv fur Laryngologie und Rhinologie*, Bd. 25, Heft 1, p. 45, 1911.
51. WRIGHT: *The Medical Record*, October 2, 1889.
52. WRIGHT: *The Medical Record*, May 19, 1894.
53. KNAPP: *Archives of Otology*, Bd. 23, p. 71-151, 1894.
54. RIVIERE: Societe des Sciences de Lyon, November, 1900.
55. DUEL: *N. Y. Medical Journal*, December 1, 1900.
56. LIABCES: *N. Y. Medical Journal*, November 17, 1900.
57. See Semon's *Centralblatt fuer Laryngologie und Rhinologie*, 1911, p. 399.
58. UNDERWOOD: Journal Anatomy and Physiology, July, 1910.
59. AVELLIS: *Archiv. fuer Laryngologie und Rhinologie*, Bd. 11, 1900.
60. BAUROWICZ: *Archiv fuer Laryngologie und Rhinologie*, Bd. 11, 1901.
61. BOWLBY: *British Medical Journal*, May 3, 1902.
62. GUISEZ: Societe de Laryngologie, d'Otologie et de Rhinologie, November 13, 1903.
63. ONODI: *Archiv fuer Laryngologie und Rhinologie*, 17, 1905.
64. MOURE: *Revue hebdomadaire de Laryngologie, Rhinologie, etc.*, No. 1, 1905.
65. SCHWENN: *Archiv fuer Laryngologie und Rhinologie*, XI, 1900.
66. KIRSCHNER: *Archiv fuer Laryngologie und Rhinologie*, Bd. 15, Heft 1, 1903.
67. BRINDEL: *Gazette hebdomadaire des Sciences medicales de Bordeaux*, No. 12, 1904.
68. CITELLI: *Archiv fuer Laryngologie und Rhinologie*, Bd. 15, p. 252,
69. ONODI: *Archiv fuer Laryngologie und Rhinologie*, Bd. 15, p. 169.
70. AVELLIS: Versammlung Sueddeutscher Gesellschaft, June 12, 1905.
71. HARMER: Wiener Laryngologische Gesellschaft, January 11, 1905.
72. CALAMIDA: *Arch. Intern. de Laryngologie*, March, April, 1905.
73. LERMOYEZ: Societe de Laryngologie d'Otologie et de Rhinologie, de Paris, February 12, 1909. KUBO: *Archiv fuer Laryngologie*, No. 21, 1909, p. 82.
74. JACQUES: *Archiv fuer Laryngologie*, Bd. 25, p. 318, 1911.
75. WEICHSELBAUM: *Allgemeine Wiener Medizinische Zeitung*, No. 27-28, 1881.
76. FINDER: Charite Annalen, Vol. 35, 1911.
77. HARTMANN: *Deutsche Medizinische Wochenschrift*, No. 10, 1889. STRAZZA: *Bollctino delle Malattie dell'Orechio, della Gola, etc.*, No. 9, 1893. BRYAN: *N. Y. Medical Journal*, January 28, 1893. KLINGEL: *Archiv fuer Laryngologie und Rhinologie*, No. 3, p. 199, 1895.
78. ROBERTSON: *Lancet*, April 29, 1893.
79. ALEXANDER: *Archiv fuer Laryngologie und Rhinologie*, Bd. 22, p. 260, 1909.
80. HARTMANN: Versammlung der Gesellschaft deutscher Naturforscher und Aertzte, 1898. STEWART: *Lancet*, December 10, 1898.

81. KILLIAN: *Archiv fuer Laryngologie*, Bd. 2, p. 234, 1895; *Archiv fuer Laryngologie*, Bd. 3, p. 17; *Archiv fuer Laryngologie*, Bd. 4, p. 1 and 276.

82. TILLEY: *Lancet*, September, 1896; *Revue Internationale de rhinologie, etc.*, No. 1, January, 1897.

83. BRYAN: Transactions American Laryngological Assn., 1895.

84. MYLES: *Medical News*, March 28, 1896; *Medical News*, August 7, 1897.

85. LATHROP: Frontal Sinus and Ethmoid Cells; Warren Triennial Prize, 1898, with addition of Part 2 on the Clinical and Surgical Aspects of Sinus Disease.

86. SIEUR: *Revue hebdomadaire de Laryngologie*, No. 38, 1901. Also

87. THIERRY AND MARTEL: *Annales des Maladies de l'oreille, etc.*, April, 1905.

88. ONODI: *Archiv fuer Laryngologie und Rhinologie*, Bd. 9, 1901.

89. ONODI: *Archiv fuer Laryngologie und Rhinologie*, Bd. 15, Heft 2, 1903, p. 259; *Archiv fuer Laryngologie und Rhinologie*, Bd. 17, 1905.

90. KILLIAN: Die Nebenhoehle der Nase und ihre Lagebeziehungen zu den Nachbarorganen, 1903.

91. BRUEHL: *Zeitschrift fuer Ohrenheilkunde*, Bd. 40, 1903.

92. HANSEN AND PLUDER: *Archiv fuer Laryngologie und Rhinologie*, Bd. 14, 404.

93. ONODI: *Archiv fuer Laryngologie und Rhinologie*, Bd. 15, p. 363, 1903.

94. MOSHER: Transactions American Laryngological Assn., 1904.

95. WRIGHT: Twentieth Century Practice of Medicine, Vol. VI, 1895. HAJEK: Pathologie und Therapie der Nebenhohlen der Nase, 1899.

96. ONODI: *Archiv fuer Laryngologie und Rhinologie*, Bd. 10, p. 474, 1904.

97. GRUENWALD: *Archiv fuer Laryngologie und Rhinologie*, p. 182, Bd. 23, 1910.

98. SCHAEFFER: *Annals of Otology, Rhinology and Laryngology*, December, 1910.

99. ONODI: Die Nebenhoehle der Nase beim Kinde, 1911.

100. CANESTRO: *Archiv fuer Laryngologie*, Vol. 25, Heft 3, 1911.

101. SCHEIER: *Archiv fuer Laryngologie und Rhinologie*, Vol. 6, p. 57, 1897.

102. COAKLEY: *Annals of Otology, Rhinology and Laryngology*, March, 1905; Transactions American Laryngological Assn., 1905.

103. HERZFELD: *Beitraege zur Anatomie, Physiologie, Pathologie und Therapie des Ohres, der Nase und des Halses*, Bd. 2, p. 346 and 650, 1909.

105. KUETTNER: Die entzuendliche Nebenhoehlenerkrankungen der Nase im Roentgenbild, 1908. See, also, SPIESS: Die Roentgenuntersuchung der oberen Luftwege. Atlas und Grundriss der Roentgendiagnostik in der inneren Medicin. Herausg. von Franz M. Groedel. Lehmann's Medizinische Atlanten, Bd. 7, 1909.

105. ALBRECHT: *Archiv fuer Laryngology and Rhinology*, Bd. 20, p. 175, 1908.

106. CALDWELL: THE LARYNGOSCOPE, November, 1908.

107. See, also: The Skiagraphy of the Accessory Nasal Sinuses, 1912, by Turner and Porter.

108. HAIKE: *Archiv fuer Laryngologie und Rhinologie*, Bd. 23, 1910, p. 206.

109. See, for instance: MAUER: *Archiv fuer Laryngologie und Rhinologie*, Bd. 18, 1906.

110. FREUDENTHAL: *Annals of Otology, Laryngology and Rhinology*, 1912.

111. KRAUSE: *Monatschrift fuer Ohrenheilkunde*, No. 3, 1887.

112. KILLIAN: *Muenchener Medizinische Wochenschrift*, No. 31, 1896.

113. SEIFERT: Physiologische Medizinische Gesellschaft zu Wurzburg, April 29, 1899.

114. Rethi: *Journal American Medical Assn.*, December 2, 1899.
115. Sondermann: *Muenchener Medizinische Wochenschrift*, 1905; *Archiv fuer Laryngologie und Rhinologie*, Bd. 17, p. 423, 1905.
116. Spiess: *Archiv fuer Laryngologie und Rhinologie*, Bd. 17, p. 179, 1905.
117. Menzel: *Archiv fuer Laryngologie und Rhinologie*, Bd. 17, p. 371, 1905.
118. Claus: *Beitraege zur Anatomie, Physiologie, Pathologie und Therapie des Ohres, der Nase und des Halses*, Bd. 4, p. 88, 1910.
119. Reichert: Berliner Laryngological Society, December 5, 1902. Hirschmann: *ibid.* March 13, 1903; *Archiv fuer Laryngologie und Rhinologie*, Bd. 14, Heft 2, 1903.
120. Tovolgyi: *Archiv fuer Laryngologie und Rhinologie*, Bd. 25, p. 144, 1911.
121. Ogston: *Medical Chronicle*, December, 1884.
122. Winckler: *Archiv fuer Laryngologie und Rhinologie*, Bd. 1 and 2, 1893.
123. Scheier: *Wiener Medizinische Presse*, No. 10, 1898.
124. Herzfeld: *Deutsche Medizinische Wochenschrift*, No. 12, 1895.
125. Tilley: *Lancet*, September 26, 1896.
126. Treitel: *Berliner Klinische Wochenschrift*, No. 51, 1896.
127. Botey: *Revue di Ciencias Medicales di Barcelona*, Nos. 22-23, 1896.
128. Luc: *Bulletin et Memoires de la Societe francaise de laryngologie et d'otologie*, 1896.
129. Luc: Academie de Medecine, March 2, 1897.
130. Waggett: London Laryngological Society, January 12, 1898.
131. Kuhnt: Ueber die entzuendliche Erkrankungen der Stirnhoehle und ihre Folgezustaende, 1895.
132. Killian: *Muenchener Medizinische Wochenschrift*, No. 28, 1895.
133. Krauss and Killian: *Archiv fuer Laryngologie und Rhinologie*, Bd. 13, p. 28 and 59, 1902.
134. Gussenbauer: *Wiener Klinische Wochenschrift*, No. 21, 1895.
135. Broeckaert: Ref: *Centralblatt fuer Laryngologie und Rhinologie*, 1910, p. 599; *Centralblatt fuer Laryngologie und Rhinologie*, 1911, p. 596.
136. Ritter: Verhandlungen des Vereins Deutschen Laryngologen, 1911.
137. Jacques: International Laryngo-Rhinological Congress, 1911.
138. Luc: *Zeitschrift fuer Laryngologie*, Bd. 4, p. 273, 1911.
139. Ingals: The Laryngoscope, April, 1907. *Journal American Medical Assn.*, May 9, 1908.
140. Skillern: The Laryngoscope, June, 1908.
141. Worthington: The Laryngoscope, December, 1909.
142. Ingals: The Laryngoscope, February, 1910.
143. Sieur and Rouvillois: *Revue hebdomadaire de Laryngologie, d'Otologie et de Rhinologie*, p. 225, 1911.
144. Vacher: *Bulletin d'Otologie, Rhinologie, Laryngologie*, Tome XIV, April, 1911.
145. Halle: *Archiv fuer Laryngologie und Rhinologie*, Bd. 24, Heft 2, 1911.
146. Societe francaise de l'oto-rhino-laryngologie, 1911.
147. Onodi: *Archiv fuer Laryngologie und Rhinologie*, No. 14, p. 154, 1903.
148. Jansen: *Archiv fuer Laryngologie und Rhinologie*, Bd. 1, Heft 2, 1893.
149. Hartmann: *Deutsche Medizinische Wochenschrift*, p. 190, 1889.
150. Berens: The Laryngoscope, March, 1904.
151. Caldwell: *New York Medical Journal*, November 4, 1893.

153. Luc: *Archives Internationales de Laryngologie*, No. 3, 1897.
154. Partsch: Ref. in Boenninghaus.
155. Boenninghaus: *Archiv fuer Laryngologie und Rhinologie*, Bd. 6, p. 220, 1897.
156. Luc: Lectures sur les supurations de l'oreille moyenne et des cavites accessoires du nez et sur leurs complications intracraniennes. Paris, 1900.
157. See, also: Herzfeld: *Monatschrift fuer Ohrenheilkunde*, 1, 1898. Post: *Muenchener Medizinische Wochenschrift*, No. 39, 1898.
158. Alsen: *Archiv fuer Laryngologie und Rhinologie*, Bd. 12, 1901.
159. Denker: *Archiv fuer Laryngologie und Rhinologie*, 17, 1905.
160. Kretschmann: *Muenchener Medizinische Wochenschrift*, No. 1, 1905, No. 26, 1907.
161. Friedrich: *Deutsche Medizinische Wochenschrift*, No. 37, 1904.
162. Boerger: *Archiv fuer Laryngologie und Rhinologie*, Bd. 18, p. 524, 1906.
163. Freer: The Laryngoscope, May, 1905.
164. For evidence of the tendency to operate on the maxillary sinus by the intra-nasal route see references to articles on p. 130-131 of Semon's *Centralblatt fuer Laryngologie und Rhinologie*, 1910.
165. Flatau: Berliner Laryngologischer Gesellschaft, December 1, 1893.
166. Hajek: *Archiv fuer Laryngologie und Rhinologie*, Bd. 4, p. 276, 1896.
167. Hirsch: *Monatschrift fuer Ohrenheilkunde*, Heft 6, p. 637, 1911.
168. Rouge: Nouvelle Methode Chirurgicale Pour e traitement de 'ozene, 1873.
169. Partsch: *Deutsche Medizinische Wochenschrift*, No. 12, 1900.
170. Loewe: *Monatschrift fuer Ohrenheilkunde*, July-October, 1900.
171. Goris: International Medical Congress, 1900. Laryngological Section.
172. Moure: *Revue hebdomadaire de Laryngologie, d'Otologie et de Rhinologie*, No. 43, October 24, 1896.
173. d'Arcy Power: *British Medical Journal*, September 15 and November 6, 1897.
174. Mayer: Transactions American Laryngological Assn., 1901.
175. Coffin: The Laryngoscope, November, 1904.
176. Schadle: *New York Medical Record*, May 25, 1907.
177. Bosworth: *New York Medical Record*, October 13, 1894.
178. Gruenwald: Lehre von den Naseneiterungen, 1893. Naturforscherversammlung, Frankfort, 1896. *Centralblatt fur Chirurgie*, No. 3, 1906.
179. Uffenorde: Die Erkrankungen des Siebbeins, 1907.
180. Skillern: *Archiv fuer Laryngologie und Rhinologie*, Bd. 20, 1908.
181. Horsley: *British Medical Journal*, 1906, II, p. 44.
182. Caton and Paul: *British Medical Journal*, 1893, p. 1421.
183. Moskowitz: *Wiener Klinische Wochenschrift*, p. 792, 1907.
184. Schmiegelow: Ref: *Centralblatt fuer Laryngologie*, p. 117, 1911.
185. Hirsch: *Wiener Klinische Wochenschrift*, No. 44, 1910.
186. Goris: Ref: *Centralblatt fuer Laryngologie*, p. 118, 1911.
187. West: *Archiv fuer Laryngologie und Rhinologie*, Bd. 23, p. 288, 1910.
188. Loewe: *Berliner Klinische Wochenschrift*, p. 378, 1908.
189. Vorschuetz: *Deutsche Zeitschrift fur Chirurgie*, No. 94, 1909.
190. Kuehn: Berliner Laryngologischer Gesellschaft, April 7, 1911.
191. Onodi: *Zeitschrift fuer Laryngologie*, Bd. IV, p. 1, 1911.
192. Knapp: Fifth Ophthalmological Congress, 1876, p. 57.
193. Knapp: *Archives of Ophthalmology*, Vol. 9, No. 2, 1880.
194. For instance: Peltesohn: *Centralblatt fuer praktische Augenheilkunde*, February, 1888.

195. ZIEM: *Monatschrift fuer Ohrenheilkunde, etc.*, No. 8-9, 1893.
196. ONODI: Die Sehnerven und die Nebenhoehlen der Nase, 1907.
197. ROEHMER: *Revue Medicale de l'est*, July 1, 1895.
198. AXENFELD: *Deutsche Medizinische Wochenschrift*, No. 40, 1902.
199. SCHMIEGELOW: *Archiv fuer Laryngologie und Rhinologie*, Bd. 18, Heft 3, 1906.
200. POSEY: *N. Y. Medical News*, October 25, 1905; *N. Y. Medical Journal*, March 2, 1907, and November 2, 1907.
201. ONODI: Transactions British Medical Assn., July, 1904; *Archiv fuer Laryngologie und Rhinologie*, Bd. 17, p. 260, 1905.
202. *N. Y. Medical Record*, July 4, 1908.
203. BAUMGARTEN: *Monatschrift fuer Ohrenheilkunde, etc.*, No. 5, 1906.
204. HOFFMANN: *Zeitschrift fuer Ohrenheilkunde, etc.*, Bd. XVI.
205. LOGAN TURNER: *Edinburgh Medical Journal*, May, 1909.
206. See: *Centralblatt fuer Laryngologie, etc.*, 1911, p. 402, 3-4-5.
207. DREYFUSS: Die Krankheiten des Gehirns und seiner Adnexa im Gefolge von Naseneiterungen, Jena, 1895.
208. CRAIG: *New York Medical Journal*, March 24, 1900.
209. ST. CLAIR THOMPSON: The Lancet, August 12, 1905.
210. ONODI: Ref: *Centralblatt fuer Laryngoolgie, etc.*, 1911, p. 433.
211. GERBER: Die Complicationen der Stirnhoehlentzuendungen, Berlin, 1909.
212. KUETTNER: *Centralblatt fuer Laryngologie, etc.*, 1909, p. 168.
213. WEIL: Wiener Laryngologische Gesellschaft, February 6, 1896; *Wiener Medizinische Wochenschrift*, No. 16-20, 1897.
214. KILLIAN: International Medical Congress, 1909.
215. SEMON: London Laryngological Society, February 1, 1901.
216. WRIGHT: *N. Y. Medical Journal*, October 7, 1905.
217. KUETTNER: *Berliner Klinische Wochenschrift*, No. 11, 1908.
218. HAJEK: International Medical Congress, 1909.
219. For instance: KANDER: *Medizinische Klinik*, No. 29, 1907.
220. UFFENORDE: Die Erkrankungen des Siebbeins, Jena, 1907.
221. BRAUN: *Deutsche Medizinische Wochenschrift;* LANGE: *Beitraege zur Anatomie, Physiologie, Pathologie und Therapie des Ohres, der Nase und des Halses*, Bd. 5, p. 294, 1911.
222. KILLIAN: *Centrlblatt fuer Laryngologie*, 1912, p. 436.
223. UFFENORDE: *Centralblatt fuer Laryngologie*, 1912, p. 441.
224. BRAWLY: THE LARYNGOSCOPE, September, 1910.

New York Post-Graduate Hospital.

Peculiar Case of Carcinoma of the Pharynx. R. IMHOFER. *Prac. med. Wchnschr.*, March 21, 1912.

Case of man aged 45 years. A relatively small tumor which did not penetrate deeply in the mucous membrane caused intense glandular swelling. The blood took on a luekemia-like character. Death was indirectly due to an inter-current angina which was itself entirely relieved but which caused the carcinomatous glands to become purulent and a sepsis to develop. ED.

AN UNUSUAL CASE OF OSTEOMA OF THE SUPERIOR MAXILLA.

DR. M. DELMAR RITCHIE, PITTSBURGH.

Emil S., a German of gigantic stature, was referred to the rhinological side of the Columbia Hospital February 17, 1912. Had been a sufferer from the consequence of complete nasal stenosis for seventeen years, and presented the frog face typical of osteoma of superior maxilla. The left orbit with its contents was displaced markedly upward and outward, history bringing out a diplopia of long standing. The palpating digit in the naso-pharynx outlined a bony mass of the size of the butt end of a hen's egg. The finger, however, could not be passed between the posterior surface of the growth and the anterior wall of the pharynx.

In June, 1902, Dr. Gustave Mueller, since deceased, at the Homeopathic Hospital, used a small trephine under local anesthesia and succeeded in providing for our patient some nasal respiration. The patient stated that so long as the nose bled he had fair nasal breathing, but in a few months there was a lapse into complete stenosis. Dr. S. L. McCurdy in 1910 removed three ounces of an osteoma from our patient by way of an external incision.

Examination before operation demonstrated purulent ethmoiditis. A probe could be passed through the left nasal orifice around the bony mass and presented (via fistula) at inner canthus. The ethmoidal pus found its exit by way of this fistula, and the left palpebral fissure was filled by this pus on any attempt to blow the nose.

An incision was made starting at the inner terminus of the left eye-brow, extending over the nasal bone into fissure at labial attachments of left ala, to a point in upper lip just short of its oral mucous membrane. A second curvilinear incision left the first at level of left inner canthus and extended half an inch below the infra-orbital margin to malar prominence.

Retraction of flaps, the nose being turned well over right cheek, showed an ivory-like mass larger than a man's fist encroaching in every direction. All that was left of the septum was a fragment of the triangular cartilage jammed against the right maxilla.

The presenting picture was that of a nasal cavity forcibly expanded in every direction, its septum and sinuses being obliterated by a white bony mass. There was a V-shaped prolongation extend-

ing upwards pressing upon the ethmoidal areas. The mesial walls of both antra were obliterated, and the nasal floor could not be outlined. With chisel and mallet the mass was removed piece-meal. So great was the density that five new sharp chisels were necessary to complete the work. The proximity of the posterior end of the mass to sphenoid bone (less than a half inch intervening) associated with the extreme density, made chiseling at a depth of five inches somewhat hazardous.

Heavy line shows size of osteoma; dotted lines show incisions.

A sheet of lead in the pharynx saved the mucous membrane of the pharynx. Most of the ethmoidal cells on both sides were obliterated, and those that remained were curetted. The right antrum was about half filled with an extension of the mass, while the left was completely filled.

A study of the outlines that could be made out in the progress of the removal with the direction of the deflection, leads to the conclusion that the mass had its origin in the left superior maxilla. Re-

moval was persisted in until in no direction was there found any bone of the ivory hardness. Sinuses were curetted and mucous membrane was carefully stitched as first step in closure, being particular to obliterate the fistula into left inner canthus. The external wound was closed with fine silk, which was removed on the second day with little scar remaining. The operative field was packed by way of nose with tincture benzoin comp. gauze. Patient left hospital fifth day. Nasal respiration restored and was unimpaired July 1. All distressing pain and insomnia previous to operation disappeared.

Empire Building.

Otogenous Sepsis and Pyemia. F. LUDWIG, *Ztschr. f. Ohrenh. u. Laryngo-Rhinol.*, Band 65, Heft 4, August, 1912, p. 289.

The writer reports fourteen cases of sinus thrombosis, mostly in young individuals. Ten of the cases followed acute middle-ear suppuration, while four were due to chronic otitis; among the latter, cholesteatoma was present in three cases. Death occurred in three cases only. Recovery was mostly protracted and in five cases required secondary operation.

The jugular vein was ligated in but two cases. The author is, however, of the opinion that even in these cases the result would have been just as good without ligation. In the fatal cases, on the other hand, this procedure would not have been of any avail.

In cases of severe, acute otitis due to the infectious diseases, the sinus has to be exposed in the very first days. If, after waiting a few days the temperature does not drop, the sinus should be further exposed toward the torcular and downward; in such cases a progressive phlebitis and periphlebitis of the sinus, together with a progressive affection of the surrounding bone is always encountered. The writer relies in such cases upon the vitality and bactericidal powers of the blood and does not resort to ligation of the jugular vein or opening of the sinus. In the presence of a small mural thrombus, the exposed sinus wall is disinfected. The author advocates the same procedure in uncomplicated acute or chronic middle-ear suppurations, where suddenly symptoms of sinus involvement develop.

GLOGAU.

A PROBABLE TUMOR OF THE LUNG DIAGNOSED BY UPPER BRONCHOSCOPY.

DR. RICHARD H. JOHNSTON, BALTIMORE.

In May, 1912, Mrs. J. E. L., 62 years old, was referred to me by Dr. James Bordley for persistent cough with expectoration of blood. The patient had been examined by Dr. T. R. Boggs who found stenosis of a bronchus on the right side. Though the patient was stout and had a thick neck there was no difficulty in passing the 9 mm. bronchoscope without the speculum. Aside from some congestion the trachea and main bronchi were normal. Nothing abnormal was found in the secondary bronchi leading to the upper and middle lobes of the right lung. On passing the bronchoscope further down blood was seen coming from one of the anterior terminal bronchi. When this was wiped out, one could see at the beginning of the tertiary bronchus a fringe-like mass which bled easily. Unfortunately I had no small forceps powerful enough to remove a piece for microscopic examination. However, I had no hesitation in making a diagnosis of a tumor of a tertiary bronchus with probable extension to the lung. Eight months previously Dr. Bordley had removed the right eye for sarcoma of the ciliary body. While the examination was unsatisfactory in that we did not secure a specimen for microscopic examination, we did succeed in establishing the source of the blood. Time will tell whether the growth is malignant or not All who saw the picture through the bronchoscope agreed that it was a tumor, not amenable to treatment.

807 North Charles Street.

Diagnosis and Therapy of Laryngeal Carcinoma. J. FEIN *Monatschr. f. Ohrenh. u. Laryngo-Rhinol.*, Heft 1, p. 69, 1912

Fein reported a case of laryngeal carcinoma in which, however, the characteristic laryngeal symptoms were few and the histological diagnosis uncertain. The case covered a period of fourteen years In connection with this report Fein discusses the value of microscopic examination in the diagnosis of laryngeal carcinoma and the limited value of radical operation. ED.

THE EARLY HOME TREATMENT OF THE DEAF CHILD.*

DR. G. HUDSON-MAKUEN, PHILADELPHIA.

In order to make the so-called oral method of teaching the deaf child more widely applicable and generally useful, it will be necessary to improve somewhat upon our present methods of teaching it, and it is my purpose at this time to emphasize one of the reasons why many deaf children do not become oral successes.

As I have said on a previous occasion, the most important period in the life of the deaf child is that which comes before the school age. It is the period during which the hearing child develops a fairly good command of language preparatory to taking up the work of his school education. Under our present system, as Dr. Kerr Love has said, the deaf child arrives at the school age in the intellectual condition of the child of two, and consequently several years must be devoted to the acquirement of speech before his general education can be taken up. This is on the principle that any systematic and effective intellectual development must proceed simultaneously with the development of the vehicle for thought, or some form of language and speech.

This principle is well illustrated in the case of the normal hearing child, who not only learns to understand the speech of others and to acquire speech for himself, but he does it all during the first four or five years, and without any conscious effort on his own part. Children inherit a natural tendency toward the development of speech, which can only be thwarted in its processes by some positive and pronounced physical or psychical disability.

The period during which the understanding of speech and its natural consequence, the practical use of speech, are developed is a definite and limited one, and when it has once passed it is doubtful whether perfectly normal speech can ever be acquired. This period begins in the second year and it is practically half over at the arrival of the school age; so that manifestly, other things being equal, it must be a mistake to deprive the deaf child of all this valuable time.

The principle of non-interference with the development of the normal child has many arguments in its favor, but that it cannot be applicable in the case of abnormal children must be admitted by

*Read at the meeting of the Ninth International Otological Congress, Boston, August 16, 1912.

those who have had experience with the deaf. The normal child, possessed of all his faculties, easily and quickly adapts himself to his environment and grows like "Topsy" into more or less perfect harmony with his surroundings; but when he is deprived of one or more of his senses, this harmonious development is at once checked and he becomes different from his fellows. Not only does he not improve with age, but he retrogrades, especially in respect to his emotional and psychical condition.

The deaf child, for instance, is usually a spoiled child, and when left to his own devices during the period immediately preceding the school age, he becomes mentally and physically incapacitated for the reception of any kind of instruction until after a more or less protracted course of training has been carried out.

The deaf baby is generally misunderstood and therefore neglected. The hearing baby, on the other hand, immediately becomes the pride of the household and receives too much attention. In this way they are both spoiled. Neglect of the deaf child, however, is a specially serious matter, because it tends immediately to check his natural and inherited tendencies to acquire language and speech. Even the congenitally deaf child inherits, through a long line of hearing ancestors, marked tendencies or inclinations to speak, as is shown by his babbling and prattling. These early phonatory and articulatory manifestations are the beginnings of speech and they should be encouraged to the greatest possible extent, and not ignored, as is usually the case.

The normal child learns the meaning and use of words by hearing them frequently repeated and by observing their association, and it has been shown that the deaf child can do likewise, with only a little less accuracy, by seeing words frequently repeated.

That hearing is not absolutely essential to a more or less accurate understanding of speech has been fully demonstrated in the case of numerous deaf children. Strictly speaking, speech is never heard, but only the voice is heard, and this, as has been pointed out, is no essential part of speech. Animals possess the faculty of phonation, but articulation is the prerogative of man. The phonetic element in speech is heard, while the articulation, or speech proper, is seen rather than heard, even in the development of normal children.

The training of the powers of observation, therefore, is of the first importance in the education of the deaf child. It has been found that the one with the most observant eye is the one who becomes not only the best lip-reader, but also the best speaker. The

hearing child possesses more inducements to use his powers of observation than the deaf child, because he looks for the source of what he hears, whereas the neglected deaf child lapses into a world of silence and soon gives up trying to understand his environment. Special training of the powers of observation, therefore, is indicated at the earliest possible moment and numerous exercises for this purpose will readily suggest themselves. The child should be trained to look at things at different angles without moving the head, thus giving the exercise necessary for the development of the ocular muscles. Especially should the deaf child be trained to observe the facial movements employed in speaking, and the mother or governess should be impressed with the importance of keeping her face in a good light.

Next in importance to the development of the powers of observation in the deaf child is the development of the sense of touch. It has been shown that of all the physical senses, the sense of touch is the first to manifest itself in infancy and the first also to retrograde or deteriorate when it is neglected. This fact is recognized in the Montessori method or system of education, in which the sense of touch is utilized at the very beginning as a means of teaching not only the meaning and use of words, but also the writing of them. The tactile sense training cannot begin too early and there is scarcely any limit to the means for its employment. Just as the child may be more easily taught to use his powers of observation in the very early years, so may he be taught to use his sense of touch; and when we consider how essential the tactile sense is to a well modulated and inflected voice, especially in the absence of hearing, we can readily understand the importance of its early development.

The great obstacle to the development of speech in the deaf child is indifference or neglect on the part of those coming in contact with him, and this indifference or neglect is due almost entirely to ignorance. If the mother could know the possibilities in her child, she would not only not give up in despair, but she would take pleasure, as the skilled teacher takes pleasure, in watching and assisting in his development. In no department of educational work, therefore, is the need for the education of mothers so great as in this particular one. The mother should be made to understand that her deaf baby in all probability differs from hearing babies only in respect to his deafness. I say in all probability, for obviously the thing that caused the deafness might also have deleteriously affected the delicate cerebral structures in such close proximity to the essential organ of hearing.

It has been demonstrated, to be sure, that deaf children after the school age are not quite the equal of hearing children, either physically or mentally, but I am convinced that this is true chiefly because of the handicap which deafness imposes upon the child during the very early years, and the fact that no adequate provision is made during infancy to cut down this handicap by making other important physical senses do the work of the absent one.

Normal hearing-power, of course, is the one thing needful to the natural and automatic development of speech in children, but in one deprived of hearing, this development must take place, not automatically, but as the result of carefully planned voluntary efforts; and my own experience has led me to the conclusion that the training of the powers of observation and the sense of touch according to scientific methods would have the effect of placing the otherwise normal deaf child nearly, if not quite abreast his more fortunate fellows in the race of life. This work, however, must begin in early infancy, or as soon as the diagnosis of deafness is made, otherwise the physiological developmental speech-period will have passed and the physical, mental, and emotional nature of the child will be deleteriously affected by his inharmonious surroundings and apparent neglect.

It is in the nursery, therefore, that we must look for the beginning of the proper and effective education of the deaf child. It is in the nursery that the child begins to evince inherited tendencies that correspond in their importance to the instinct of the lower animals, and the greatest of these inherited tendencies is the tendency toward the development of speech. To allow the deaf child to pass over this period without acquiring some knowledge of speech and speech-reading and then to expect him later on to acquire these great essentials of life would be like depriving a kitten of the opportunities for the development of the play-instinct and then expect the cat later on to be playful and happy.

Having shown that the deaf child's education should begin at the very earliest possible moment, and that it should consist largely in the training of those special senses which are necessary for the acquirement of speech, it remains now to suggest some measures for the practical application of the scheme.

How can the early home-education of the deaf child best be accomplished? The first essentials, obviously, are a home and a good mother. The mother need not be especially intelligent, but she must have the mother-love and its natural concomitant, an almost overwhelming desire to help her child. In addition to this, she

must have the advice of a physician or teacher who understands the physiology and psychology of child-life and speech-development. The plan that I find productive of the best results is to have the mother witness sample lessons to the child. In these lessons the mother is shown exactly what to do in the intervals between visits. The teacher may construct a pictorial primer for the child and mother, which should be typewritten and made from a plain note-book having detachable leaves. With this primer as a guide, the mother may learn to do much of the teaching nearly or quite as well as an expert.

In the absence of a suitable home and a mother with the ability and inclination to help her child, individual homes and governesses should be procured for deaf infants, and when this is not possible and as a last resort, institutions may be provided, in which very young children may be helped to acquire speech before the school age.

Institutional treatment, however, is preferable only for the defective deaf, or those who should remain in institutions and have custodial care during their lifetime. The otherwise normal deaf child should be educated as far as possible with hearing children and in the environment in which he must live. This early home instruction, followed by day-school instruction, after the school age, would not only be far more helpful to the child, but it would serve as an important measure for the prevention of the deafness which results from intermarriages of the deaf.

SUMMARY AND CONCLUSIONS.

Deafness in childhood should be diagnosticated at the earliest possible moment, and the special sense training preliminary to the acquirement of speech should at once be instituted.

The normal child acquires speech before the school age, thus establishing this period as the physiological one for the development of speech. It is the period during which inherited tendencies to speak, amounting almost to an instinct, begin to manifest themselves and make the acquirement of speech a comparatively easy matter.

The best place for the beginning of this treatment is in the home, and the best teacher is the mother working under the direction of an expert. The otherwise normal deaf child should, if possible, be kept in the home during his entire school education, in order that he may have the advantages which accrue from association with his hearing fellows, and also that he may avoid the intimate associations which frequently result in marriage with his kind.

1627 Walnut Street.

THE INADEQUACY OF THE DRAINAGE SOMETIMES OBTAINED BY THE ORDINARY MYRINGOTOMY IN ACUTE OTITIS MEDIA AND A METHOD OF OVERCOMING THE DIFFICULTY.*

DR. ROBERT LEWIS, NEW YORK CITY.

Four years ago I was called to attend a gentleman of over 65 years of age, who was suffering at the time, and had been suffering for a number of weeks, from a virulent type of acute purulent otitis media. He was also afflicted with diabetes mellitus. Previous to my being called to attend him, he had been under the care of two of my confreres, and had been seen by a third in consultation. All had agreed that a mastoid operation was imperative. The patient and his regular medical adviser refused their consent as, in their opinion, the proposed operation, because of the patient's diabetic condition, involved a much greater danger than that which was to be feared from the possible further extension of the aural disease.

On examination of the involved ear I found the external auditory canal stenosed to some extent, the upper posterior cutaneous canal wall sagging and the drum membrane bulging, very thick, and edematous. In the mid-posterior portion of the drum membrane was a small teat-like perforation, through which the pus escaped from the tympanic cavity with difficulty. Tenderness of the mastoid process and some edema of the overlying tissues were present. I agreed with those who had previously taken care of the patient that a mastoid operation seemed to be the only procedure that was logically called for; but, as neither the patient nor his physician was willing that this operation should be performed, there remained nothing for me to do but to establish good drainage from the middle ear through an opening in the drum membrane. And here I should state that paracentesis of this membrane had already been made on at least three different occasions before I saw the patient, and mine, therefore, made the fourth. The incision which I made was very extensive, beginning under the anterior fold of the drum membrane, and extending around the circumference of the membrane, to and through the posterior fold and through the sagging portion of the canal wall.

*Read at the meeting of the Ninth International Otological Congress, Boston, August 14, 1912.

On the day after I had made this incision the drainage was free, but on the following day I found that the perforation, because of the edematous condition of the drum membrane, had so nearly closed that the purulent secretion could no longer escape freely. I then decided that an opening of a different nature would have to be made in the drum membrane. It seemed to me that nothing short of an excision of a fairly large portion of this structure would afford an opening of the desired size and of the desired degree of permanency; and such an excision I made by removing the lower and middle posterior portion of the drum membrane with the aid of Hoffman's middle-ear punch forceps. The results were very satisfactory. The discharge, which was profuse, escaped very freely, and it was found very easy to bring into contact with the inflamed mucous membrane of the middle ear such remedial solutions as have the power of thoroughly cleansing and of stimulating the parts.

After the lapse of a few weeks, the patient was able to leave for Europe; the discharge at this date did not exceed a few drops during the twenty-four hours and the perforation was no larger than a mere pin-hole. I later learned that the discharge had stopped before he landed in Europe.

In common with my confreres, I have seen cases of acute purulent inflammation of the middle-ear complicated with mastoiditis, in which all the classical symptoms of the mastoid complication were present in a most pronounced form, in which an operation was advised and even urged, and in which the patient, after refusing to submit to the proposed operation, had ultimately recovered without such interference; but in all the cases of this character that have come under my observation, the discharge, though profuse, has had a free exit through an opening in the drum membrane, which structure, however, was not markedly edematous. On the other hand, in the case which I have just briefly narrated, the edema was so marked that a simple incision gave vent to the retained inflammatory products for a short time only; thus necessitating the adoption of some measure which would establish, for a longer period, a much broader outlet. The procedure which I have described above is the only one, so far as I can see, that offers a reasonably strong prospect of furnishing such a material increase in the diameter of the drainage outlet, viz. an opening of about 3x4 mm.

In the four years that have elapsed since this patient was under my care, I have had twenty-two cases of a similar character, i. e.,

cases in which the edematous swelling of the tympanic membrane was so great as to interfere seriously with drainage from the middle ear and to render abortive every attempt that I made to improve the condition by merely incising (no matter how extensively) that membrane. In all of these cases I resorted to the use of Hoffman's middle-ear punch forceps for removing a portion of the drum membrane, and in eighteen of the cases recovery took place without the necessity of opening the mastoid cells. Furthermore, as regards these eighteen cases, I feel quite confident that, if I had not resorted in each instance to this method of draining the diseased middle ear, the mastoid operation would have eventually become imperative. I might add that in only one of these cases did the perforation in the drum membrane fail to close.

In conclusion, permit me to emphasize the fact that I advocate the adoption of the method herein described only in cases in which it becomes evident, after the lapse of a reasonable period of time, that the usual myringotomy, because of the agglutination of the edges of the incision, can not be trusted to furnish the needed freedom of drainage.

48 West Fortieth Street.

The Physio-pathologic Relations Between the Hypophysis and Various Chronic Affections of the Naso-pharynx and the Sphenoidal Cavities. CITELLI, *Ztschr. f. Laryngol., Rhino u. ihre Grenzgeb.*, Band 5, Heft 3, 1912, p. 513.

The writer found in five cadavers, where adenoid vegetation was present, hypersecretion and hyperplasia within the central hypophysis; the latter changes in the hypophysis were missing in cadavers where adenoids were not present. In adenoids and other affections of the naso-pharynx as well as in diseases of the sphenoidal cavities, clinically a psychic symptom complex of impairment or loss of memory, aprosexia, intellectual torpor and somnolence is frequently met. These symptoms probably originate in the hypophysis, since the latter, in the presence of a congenital or acquired disposition, may be pathologically influenced by affections of the naso-pharynx and the sphenoidal cavities. Treatment of the hypophysis (pituitin tablets) alone or combined with local or operative treatment of the conditions mentioned above will alleviate these symptoms. GLOGAU.

CASE OF CAVERNOUS SINUS THROMBOSIS OF OTITIC ORIGIN, WITH RECOVERY.

DR. H. R. JOHNSON, FAIRMONT, W. VA.

In the June number of the *Annals of Otology,* Adair-Dighton, of Liverpool, in reporting a case of cavernous sinus thrombosis, with recovery, in his opening paragraph, makes the following statement: "In looking over the literature of cavernous sinus thrombosis as far back as 1883, though I have found some fifty cases of the disease reported, I can find no mention of a single case ending in any other way but fatally."

I wish to report a case of cavernous sinus thrombosis of otitic origin, with recovery, occurring in my practice: John W., aged 59, glass-blower, was operated on by a general surgeon, July 10, 1909, for acute mastoiditis following acute purulent otitis media. For one week following the operation the progress of the case was favorable.

July 18, patient had distinct rigor followed by profuse sweat. Temperature rose from 99.2° to 104.5° and remained up four hours, and came down to 99.5°; 10 a. m., following day, had another chill and temperature jumped to 105°, pulse to 108. This condition continued until July 22, when I was asked to see the case in consultation. I found patient presenting the appearance of acute sepsis, with a mastoid wound in apparently healthy condition except discolored bare bone over the sigmoid sinus. In the left eye there was decided chemosis, and congestion and drooping of the upper lid, also protrusion of the globe. There was a purulent synovitis of the right knee joint. Careful physical examination failed to reveal any trouble in any other organs.

Diagnosis was septic thrombosis of sigmoid and cavernous sinus. Immediate operation was urged, which, for family reasons was deferred until following morning. That night another chill occurred, temperature jumped to 105.5°. On morning of operation the eye was protruding markedly with intense chemosis and ptosis, with deep bluish discoloration of the skin of both eye-lids from venus engorgement. Ophthalmoscopic examination showed a marked optic neuritis; vision reduced to dim light perception. Patient was in stupor but when aroused could answer questions, intelligently, but in hesitating manner.

Operation, July 28, 1909: Original mastoid wound opened and cleared of all granulations; and some necrotic tissue found at tip and in zygomatic cells; bone overlying the sinus was removed from the knee, down to as near the bulb as I could go. Sinus wall had dull gray appearance and was boggy on pressure. An incision 1¼ inches long was made in it and found to be full of dark, disintegrating clot, with no hemorrhage from either end.

Temporary dressings were now applied to mastoid wound and I proceeded to expose and ligate internal jugular vein; ligature applied below the thyroid and above the facial branch, and vein resected. The vein below this point seemed to be healthy, while that above was inflamed, but contained fluid blood, up to the facial branch. Curetted the upper end of the vein up to bulb and from above downward from the sigmoid toward bulb, but got no flow of blood. Put sutures in neck-wound but did not draw the lip of wound together; inserted rubber drainage-tube in upper and lower angle of wound, meeting in the middle. Attention was now directed to the upper end of sigmoid sinus, which was uncovered to within ¾-inch of the torcula and curetted to the torcula, with no flow of blood.

In both ends of the sigmoid, a loose gauze drain was introduced and usual dressings applied, and patient returned to bed with very slight prospects of recovery.

The right knee-joint was opened the following morning by the surgeon who had charge of the case, and about three ounces of greenish-yellow pus discharged,—this through drainage, etc. Made rapid recovery.

The neck wound began to suppurate on fourth day. Pus showed streptococci, but under irrigations and free drainage, healed in four weeks. The mastoid was slow in healing, taking over eight weeks. There was chill, five hours after operation, which was the last. Temperature varied from 100° to 102° for over three weeks, but was normal and remained so after fourth week. The chemosis, ptosis and bulging of the globe gradually subsided, but vision was entirely lost due to post-neurotic optic atrophy. Patient left hospital eleven weeks after operation, having made complete recovery and is living at the present time.

People's Bank Building.

NYSTAGMUS PRODUCED BY GALVANISM OF INDIVIDUAL SEMI-CIRCULAR CANALS.*

DR. LESTER M. HUBBY, NEW YORK CITY.

Although Galvani first noticed the phenomenon of the electrical current named after him in 1780, and Volta invented the first galvanic cell in 1799, it was not until the middle of the following century that the physiological effects upon the head were particularly noted.

Duchenne of Bologne,[1] and Remak of Prussia, in 1869, found that the current applied to the region of the head or face caused flashes of light, *dizziness*, metallic taste, noises in the ears, and a *tendency to tilt the head to one side.*

Poore,[2] in 1876, wrote: "It was once a matter in dispute, but is so no longer as to whether or no the brain could be influenced by currents.

"If the reader will take the two rheophores of a galvanic battery, and place them on either side of the head, and gradually and very cautiously increase the current, he will first feel a fullness of the head, then giddiness, and lastly, if the current be too strong, will stagger and fall."

In 1873, Hitzig[3] wrote that on passing the galvanic current through the back of the head, at the moment of closing the circuit the patient fell towards the anode and both eyes turned with spasmodic rolling movements towards the cathode.

In 1900[4] it was taught that the nystagmus, the tendency to fall towards the anode, the conjugate deviation of the eyes, etc., induced by galvanism were due to the production of catelectrotonus of one cerebral hemisphere and of anelectrotonus of the other cerebral hemisphere.

In 1906[5] it was thought possible that galvanic nystagmus was due to influence of the current on the semi-circular canals.

A few years later, Neumann found that galvanic nystagmus could be induced in an individual whose semi-circular canals had been totally removed. He therefore claimed that the phenomenon was due to stimulation of the vestibular nerve or centers.

To demonstrate that each semi-circular canal (through its crista) can be galvanically stimulated to produce its particular type of nystagmus, is the purpose of this paper.

*Presented as a candidate's thesis to the American Laryngological, Rhinological and Otological Society, Philadelphia, May, 1912.

For greater clearness a few of the electrical principles involved are here stated. Body resistance to the passage of the current is modified by the following conditions: 1. A thick, dry, cold skin offers greater resistance than a thin, warm, moist skin. Therefore mucous membranes offer less resistance than the skin. 2. Small or inefficiently applied electrodes show a high resistance. 3. The lower the electromotive force of the current the greater the resistance. 4. The duration of the test affects the resistance by the hyperemia and moisture induced in the skin.

Resistance is calculated by dividing the voltage by the strength of the current expressed in amperes. The passage of a galvanic current through a nerve produces a state of electrotonus, in which there is altered irritability and conductivity. Near the cathode (catelectrotonus) the condition of nerve irritability and conductivity is increased. The reverse is true near the anode and the condition is called anelectrotonus.

The first problem was to discover whether there were any points on the skin or mucous membranes of the head of a normal individual where galvanism could produce the different types of vestibular nystagmus. In this experiment ordinary sponge electrodes, 5 cm. in diameter, except when otherwise specified, were used. Every possible combination of the following points of application of the cathode and anode were made,—on the tonsil, at the Eustachian isthmus by means of Duel's gold Eustachian electrode, at the vertex of the head, at the temple, in front of the tragus, in the external auditory canal with a special small sponge electrode, over the mastoid antrum, immediately below the mastoid tip, and in the palm of the hand.

The results were negative. The type of the nystagmus was the same in each individual wherever induced. It was always either rotary, horizontal, or intermediate between these two. Only one of these three types occurred in each one tested. Bárány[6] believes that rotary-horizontal nystagmus is the type most easily produced by all forms of vestibular stimulation. He observed that it occurred after unilateral destruction of the labyrinth, after galvanic stimulation of the vestibular nerve, in all spontaneous attacks of vertigo, and usually following sudden head-movements.

The best places for application of the electrodes to produce nystagmus with the lowest milliamperage were found to be the Eustachian isthmus, the external auditory canal, in front of the tragus, and over the mastoid antrum. The results were greater with the electrodes on two of the above spots than with one in the hand.

The resistance was noted and found to vary from 10000-24000 ohms in one, and from 6000-25000 ohms in another individual, according to the points of electrode application. The electro-motive force required in the first individual varied from 10-24 volts, in the second, from 6-25 volts, to bring the current up to 1 milliampere. The lowest resistance was encountered at the Eustachian isthmus and the next lowest at the tonsil.

The strength of current needed to produce nystagmus when the current was applied as above indicated varied from 2-9 milliamperes or an average of 4½ milliamperes. G. W. Mackenzie[7] found the average to be 4 milliamperes. He also found that in a normal individual the milliamperage necessary to produce nystagmus in the two ears should not differ more than 1 milliampere.

Various nystagmographs have been devised. Wojatschek, Buys,[8] and G. Gradenigo[9] report successful nystamograms. Buys claims that he can get good records with a current of 3 milliamperes. If a practical instrument could be devised for this purpose the slight variations from the normal could be studied more accurately and with less discomfort to the patient.

The second problem was to discover whether there were any points in the tympanum, the aditus, or the mastoid antrum, where galvanism could produce the different types of vestibular nystagmus.

The tests were tried on a man seven days after a radical mastoid operation had been performed on the right side. The skin flap had not been made, on account of dural exposure from erosion of the tegmen tympani, and sigmoid sinus exposure from a like erosion over its descending portion in the mastoid process. Before doing the plastic work the tests were made with the patient under ether anesthesia, the head lying on the left side. The eyes were closely observed by three other physicians during the application of the electrodes by the operator.

As the internal diameter of the osseous ampulla of a semi-circular canal is 1½-2 mm. and the distances between the centers of the ampullae about 2-2½ mm. to concentrate the current upon one ampulla exclusively suggested the use of an electrode of about 1 mm. in diameter. Gold electrodes insulated nearly to the tip were used.

To avoid stimulating more than one canal, it seemed probable that the use of two electrodes applied over their external walls would be more successful than the application of one electrode over the canal and the other electrode in front of the tragus. This assumption proved to be incorrect. No nystagmus was produced, no matter where the electrodes were placed in the neighborhood of

the semi-circular canals, notwithstanding the fact that the facial nerve reacted to the current. The strength of the current used varied from 0-10 milliamperes.

The next experiment consisted in applying the 1 mm. cathode to the various canals and the anode (a moistened sponge electrode 5 cm. in diameter) to a point in front of the tragus of the ear on the same side of the head. On application directly over the horizontal semi-circular canal there was a strongly marked slow movement of the eyes horizontally to the left. This movement was the slow vestibular component of the nystagmus.

On application of the current at about the junction of the tegmen of the aditus with its internal wall vertically above the horizontal canal, there was a slow movement of the eyes to the left and upwards. On applying the cathode to a point a few millimeters posterior and a few millimeters below the external semi-circular canal there was a slow movement of the eyes directly upwards but the excursion of the eyes was not so great as in the stimulation of the superior and external canals. These applications were repeated several times with uniform results.

One week following the plastic operation and two weeks after the original radical operation the tests were repeated in the same manner without anesthesia. The position of the head was vertical during this test.

Three distinct types of vestibular nystagmus were produced: (1) Horizontal nystagmus to the right occurred on catelectrotonus of the right horizontal canal; (2) rotary nystagmus counter clockwise resulted from stimulation of the right superior canal; and (3) vertical nystagmus upwards on stimulation of the posterior canal.

The cathode was also applied between the oval and round windows, posterior to the pyramid. Nystagmus vertically upwards resulted. The ampulla of the posterior canal is near this region and may explain the result, though our knowledge of the effects of stimulation of the maculae acusticae of the utricle and saccule is lacking.

The strength of current required to produce nystagmus in this experiment, so that it was noticeable to the eye, was 4 milliamperes when applied over the various canals. When applied to the internal wall of the tympanum posterior to the pyramid, nystagmus resulted with a current of only 1⅕ milliamperes. Contrasted with this, 8 milliamperes were required to produce nystagmus with the cathode in front of the tragus and the anode in the hand, using the 5 cm. sponge electrodes.

CONCLUSIONS: The nearer the electrodes are placed the more superficial the penetration of the current. This explains the absence of nystagmus in placing both electrodes over the canals within two or three millimeters of each other.

Although the current penetrated deeply enough to cause reactions of the facial nerve (the posterior meatal ridge having been lowered as far as possible without direct exposure of the nerve) it did not reach the cristae in sufficient density to produce nystagmus. In placing the electrodes three to four cm. apart (cathode at each canal, anode anterior to tragus) the depth of the penetration of the current was sufficient to cause stimulation of the cristae.

The smaller the electrodes, the denser the current, the greater the resistance, and the greater the production of heat. It might be thought then that the nystagmus produced by the application of the small electrodes to the canals, might have produced the nystagmus by the production of heat over the canals, and therefore be simply the caloric reaction. This cannot be true since the resulting galvanic nystagmus did not correspond in type with that produced by caloric means. For the nystagmus produced by catelectrotonus of the external semi-circular canal corresponded to the application of cold, not heat, to the aural canal of the same side when the head was bent over the left shoulder 90°. In this position the arch of the external canal is highest and the ampulla is below, being mesad, —the current of the endolymph would therefore be towards the ampulla and the utricle, on the application of cold.

The nystagmus produced by catelectrotonus of the right superior semi-circular canal corresponded to the application of heat to the external auricular canal of the same side with the head erect, not bent to the left 90° as in the experiment.

In like manner the nystagmus produced by catelectrotonus of the right posterior semi-circular canal corresponded theoretically to the application of heat to the right posterior semi-circular canal with the head erect, or the application of cold to this region with the head rotated downwards 180°. In the experiment under anesthesia the head was bent to the left 90°, not held erect or bent downwards 180°.

In the experiment without anesthesia the head was erect and yet the type of nystagmus was not altered, except in stimulation of the posterior canal.

The explanation of the different results obtained over the posterior canals, with and without anesthesia, requires further experimentation.

BIBLIOGRAPHY.

1. G. D. Powell: The Practice of Medical Electricity, 1869.
2. Geo. Vivian Poore: Electricity in Medicine and Surgery, 1876.
3. Hitzig: *Psychiatrisches Centralblatt*, Jan., 1873.
4. H. Lewis Jones: Medical Electricity, 1900.
5. H. Lewis Jones: Medical Electricity, 1906.
6. Barany: Sixteenth International Otological Congress, Budapest, September, 1909.
7. G. W. Mackenzie: *Archiv f. Ohrenheilkunde*, Vols. 77 and 78.
8. Buys: *Monatsschrift f. Ohrenheilkunde u. Laryngo-Rhinologie*, 1909, Vol. 43.
9. Gius Gradenigo: *Arch. ital. di Otol. Rinol. e Laringol.*, March, 1910.

27 West Sixty-Eighth Street.

CASE OF FIBRO-ANGIOMA OF THE TONGUE.

DR. D. MACFARLAN, PHILADELPHIA.

J. D. aged 72, complained of "catarrh" of the nose and throat for many years. Examination showed a chronic congested pharynx, posterior wall studded with granulations; fauces, soft palate and uvula congested; nares sclerotic and dry.

At the base of the tongue on the left side there was a pedunculated growth about the size of a chestnut. It was readily snared off, the stump giving but little bleeding after touching with silver. The mass was of elastic and moderately firm consistency; rather coarsely lobulated, yellowish-gray in color and with the surface covered by a thin irregular, yellowish-gray, finely granular layer of tissue.

Microscopic examination: Section showed a mass of loose edematous meshwork of fibrous tissue very rich in large and small lymph and blood spaces. There were a moderate number of leucocytes chiefly poly-infiltrated through the fibrous meshwork. Myxomatous cells were few. The surface of the section was covered by normal epithelium and elsewhere by a thick layer of necrotic tissue, much fibrin and pus cells. There were no signs of malignancy whatever. Diagnosis: Fibro-angioma of the tongue, infected.

Strange to say, the patient was scarcely concious of the presence of this mass. He first noticed it as a lump in his throat seven or eight years ago, yet in all the intervening time it never bothered him. He had frequently been under treatment for his nose and throat condition, but in some way the tumor had been overlooked.

1805 Chestnut Street.

NEW INSTRUMENTS.

DR. J. J. SULLIVAN, JR., SCRANTON, PA.

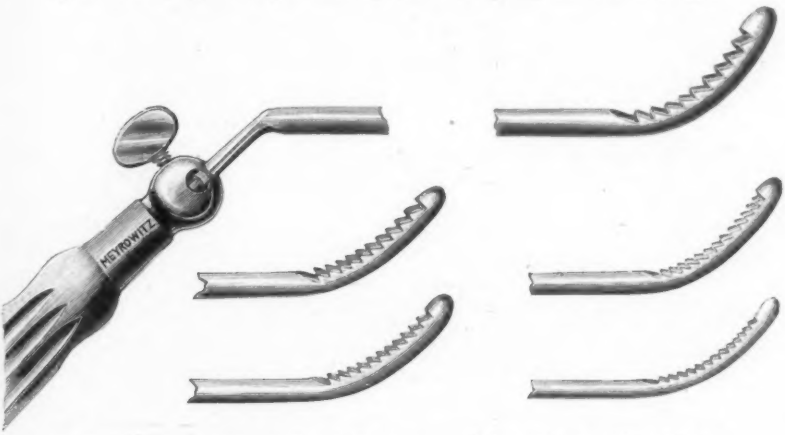
My only excuse for this article is that I have had many letters asking for more detailed description. I claim no originality—I have only succeeded in completing the technic of a simple, safe operative procedure—one that gives results with the least traumatism to nasal tissue. I am only following the idea of Goode, using instead of his instruments, a series of dilating rasps (see cut).

Technic of Operation: 1. Remove enough of the middle concha to see the hiatus and bullae. 2. Re-cocainize this part (Freer method). 3. Pass No. 1 rasp as you would a frontal probe. 4. Draw rasp downward and forward. The rasp cuts anteriorly only and should not be used with a sawing movement, (i. e., up and down). 5. Nos. 2, 3, 4, and 5 are now used as above described until an opening large enough has been made into the sinus.

Cases with closure of front-nasal duct or inability to pass probe or rasp into the sinus: 1. X-ray plate before operation. 2. Removal of the uncinate process with a Meyer ring curette or a Burrell nasal shave. This enlarges the gutter by removing its anterior wall. 3. Passing of rasps as above described. 4. Cut away loose shreds, etc., making a clean-cut wound. We all know that a number of acute frontal sinusitis clear up with intra-nasal treatment or removal of a small part of the middle concha. Knowing this I have secured drainage very often in the more obstinate cases by making the frontal cut into the middle concha as for anterior removal and then infracting the same. After infraction the No. 1 to 3 rasp is passed and the nasal frontal duct dilated enough to give drainage. Several days after the rasping or complete operation a twenty per cent solution of argyrol is introduced into the frontal sinus two or three times a week till the wound is healed. The rasps are about 2 to 4 mm. in diameter.

In intra-nasal operations on the antrum of Highmore I do not remove the inferior turbinate. I make the anterior cut and infract the inferior concha thoroughly. It is surprising, even in a narrow nose, how easy it is to remove the whole lower wall between the antrum and nasal cavity. The only part of the bone that I do remove is its inferior border and that only if it is in too close contact with the nasal floor. However, we must remember that without per-

fect nasal drainage no operative procedure will clear up in the majority of cases of sinus condition. If a deflected septum, nasal hypertrophies, adenoids, etc., are present there will be kept up a constant source of irritation and recurring infection that could hardly be cleared up even per radical. No one would think of trying to



get results in a catarrhal middle-ear condition without cleaning up any great nasal abnormalities, yet a good many of us will go on treating sinus inflammations where the ventilation and drainage of the nose are imperfect, expecting to get results. It is often a case of putting the cart before the horse.

Local Anesthetics in the Upper Respiratory Tract Including the Adrenalin Preparations. J. W. FREUDENTHAL, *Med. Rec.*, July 20, 1912.

The author mentions the various drugs employed in producing local anesthesia and in treating operative lesions of the upper-air passages, and calls our attention to some fatal cases resulting from the hypodermic uses of adrenalin in its strong solution and in combination with cocain.

While adrenalin solutions in weak solutions are valuable adjuncts to our therapeutic armamentarium, we must be very cautious in using the 1-1000 strength for hypodermic medication.

LEDERMAN.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

Regular Meeting, May 22, 1912.

JOHN F. McCOY, CHAIRMAN.

A Case of Nasal Deformity Corrected by Auto-implantation of the Septal Cartilage. By OTTO GLOGAU, M. D.

Mr. M., 20 years of age, was referred to me by Dr. Fritz Neumann, on February 27, 1912. Previous history: Patient fell and broke his nose four years ago; disfiguring saddle nose. Since that time he was unable to breathe through the nose; but the visible deformity was his only reason for presenting himself for treatment.

Present condition: Patient is in perfect health except for the nasal trouble and its immediate consequences. He presents a typical saddle nose with the special feature of the tip of the nose projecting more conspicuously than usual. Intra-nasal examination reveals a multiple fracture of the cartilaginous septum with the convexity of the deviation towards the right side. The bony septum is also deviated towards the same side. The uppermost part of the cartilaginous septum consists exclusively of mucous lining, the cartilage having been pushed downward by the injury.

Therapy: As the patient had an unsuccessful paraffin injection a year ago, another therapy had to be tried. The patient would not consent to have the deformity corrected by Carter's method of transplanting a part of the rib. It occurred to the writer to correct the nasal obstruction and external deformity simultaneously by implanting into the gap a part of the cartilage removed intra-nasally.

Operation: (Dr. Shrier assisting). The septum was prepared as for submucous resection, by applying to the Schneiderian membrane a twenty per cent cocain solution and a 1.5000 adrenalin solution with cotton pledgets. The usual incision was made on the right side, but the knife was carried right through the cartilage towards the mucous lining of the left side without, however, injuring the latter. The cartilage was then elevated from the mucous lining on the left side and by means of a strong pair of scissors an incision was made at its upper and lower margins. The cartilage flap, covered by the mucous lining of the right side, was thus attached at its posterior part only. The nostrils were now plugged with a piece of cotton and the back of the nose cleaned aseptically. A one-half per cent cocain solution, containing a few drops of adrenalin was then injected hypodermically at the middle of the nose towards the tip. A transverse incision of about 15 mm. was then made at the lower end of the nasal bones. Through this incision, by means of a knife, the subcutaneous tissue was separated along the back of the nose down to

the tip. A sharp spoon was introduced into this pocket and the cartilage at the tip of the nose curetted. The external wound was covered with a piece of gauze. The cartilaginous flap was severed from its posterior attachment and put into a physiological salt solution. By means of a Bier's skin-grafting knife, the superficial epithelial layers of the mucosa were removed, and the cartilage, covered by its perichondrium, shaped by means of a pair of scissors to fit into the deformity. The cartilage was inserted into the deformity and the transverse incision closed by catgut stitches.

The wound was covered by a small piece of iodoform gauze and adhesive plaster. The mucous lining over the bony part of the deviated septum was elevated on both sides and the bony deviation removed by the writer's submucous saws. The septal mucous lining of the left side remained intact, while on the right side there was a loss of substance corresponding to the piece of cartilage removed with its right side mucoperichondrium. The nasal cavities were painted with a ten per cent oily solution of iodin and packed in the usual way.

The intra-nasal packing was removed after forty-eight hours, the dressing of the external wound changed every day. After the fourth day the catgut ligature began to suppurate and the wound opened again. Healing by secondary granulation took place, leaving a somewhat conspicuous scar, which would have been linear by applying silkgut. The inserted cartilage became permanently attached and the deformity may now be considered as corrected.

New Operation for Depressed Fracture of the Nose Using Cartilage Intra-nasally. By F. S. Lovell, M. D

J. D., age 20; book-binder and amateur boxer. On the last day of November, 1911, he was struck on the nose, which fractured it and flattened it down on the face. The next day he went to one of the city hospitals, where a diagnosis of fracture of the nose was made. This was followed by a septal abscess, which was operated upon, irrigated, and drained with iodoform gauze. This was continued for two weeks and the wound was then allowed to heal, and the patient discharged. He was not seen again until March 1, when he again appeared, complaining that he could not breathe through the nose. The nose was very much depressed, septum thick and bulging on either side and in contact with external wall of nose, and a submucous resection was recommended. This was performed on March 9, in the usual way. On resection, it was found that there was no cartilage in the nose at all, but only fibrous tissue infiltrated. In studying the operation it was at first intended to do the two operations at one sitting, taking out the cartilage, re-inserting it under the soft parts, and raising the depression, but as no cartilage was found in his nose he was treated in the usual way, for the septum resection only. One week later another patient requiring resection of the nasal septum was operated upon, the cartilage thus removed from this man was used to correct the deformity in patient No. 1.

After injecting the patient with adrenalin, 1 dram, cocain, one-half grain, and distilled water to make one ounce, two drams of this solution

being used, incision was made in the upper part of the vestibule of the nose a half inch back, dissecting up the soft parts, and after shaping the cartilage which was removed from the other patient and which had been kept in a saline solution, it was slid through this opening and put in place from the point of the deformity above to the tip of the nose. One suture was taken to close the wound in the nose. No dressing. The patient was sent home, no inflammatory action followed, very little swelling, and the good results can be seen.

The second patient had an injury to his nose fourteen years ago, by being hit on the nose with a stone, driving it to the right and depressing it. In this instance the operation was done which was at first intended with the other, by removing his septum in the usual way and at the same sitting using it to correct the nasal depression. He could not breathe through his nose before operation. This was found to be insufficient. During the week, a submucous resection was done on another patient. This cartilage was kept in saline for a few days and then inserted through the same incision in patient No. 1 and the result as you can see is very satisfactory.

Cases Showing the Results of Treatment for Laryngeal Stenosis. By H. L. LYNAH, M. D.

The patients presented were types of chronic laryngeal stenosis following diphtheria:

Case 1: This boy was admitted to the Willard Parker Hospital, January 6, 1904, and intubated for laryngeal diphtheria. He had worn an O'Dwyer tube for seven months, then remained without the tube for two weeks, but gradual closure during this interval necessitated re-intubation, which was unsuccessful, and tracheotomy was performed in order to save his life. The tracheal canula was worn for three days, when it was removed—the patient intubated with one of my "special" tracheal dilatory tubes, and the wound allowed to granulate. After the tracheal fistula healed, the dilatation was kept up for a period of seventy-eight days, after which time the patient was able to remain without the tube, and has been without the tube ever since, for a period of eight years. He has a fairly good voice, though of deep quality.

Case 2: Boy, 4½ years of age, admitted to the Willard Parker Hospital, July 10, 1908, and intubated for laryngeal diphtheria. He had worn an O'Dwyer tube and also had been treated by my dilating tubes for a period of eighteen months, without success. The condition which caused this prolonged intubation was due to polypoid hypertrophy at the ventricular bands and slow, gradual hypertrophic contraction. A laryngotomy was advised at this stage to dissect out the hypertrophied tissue, which I may add is next to impossible, owing to the friability and vascularity of the membrane. However, the polypoid tissue and strips of the hypertrophic membrane were removed, the whole surface touched with nitrate of silver and the fissure closed about one of my bridge tubes. The wound did not heal by primary union, but became infected, and healed by granulation, leaving a dense scar.

This operation is unquestionably not the proper procedure in the treatment of these cases, and I have abandoned it as futile, for a pure cicatrix

is added to the already complex pathology. Both cases had spasms of the adductors, and were also treated by the narrow neck abductor tube. They have fairly good voices, but the voice of a cicatrix type is never as good as those treated by dilatation, for the scar when contracting pulls the cords out of place and the voice may be lost, from failure to approximate.

Two other cases were then presented which Dr. Lynah said were still under observation. He did not consider them cured, for he considered no case cured until the patient had remained without the tube for a period of one to two years. These cases had been without the tubes for a month and a half. Both were extreme grades of hypertrophic contraction and had worn tubes for four and a half years.

Case 3: A little girl of 7 years was admitted to the Willard Parker Hospital October 27, 1907, and intubated for laryngeal diphtheria. She has worn the tube ever since and was only able to remain without it for an interval of one to two weeks, when owing to gradual contraction re-intubation was necessary. She has been treated by enormous dilatation during the past year. There has been no adductor spasm, and she was never treated by the abductor tube. She has a better voice than the two cicatrix cases, the voice being almost normal.

Case 4: The other patient, a girl of 16 years, was admitted to the Willard Parker Hospital, December 2, 1907, and intubated for laryngeal diphtheria. She had marked adductor spasms, and was treated by the narrow neck tube. There has been a slight amount of dyspnea for the last week, though it did not seem to be progressive. She has a husky voice—the right vocal cord being attached to the ventricular band, the left cord is free and an absolutely normal cord.

I will now give a brief classification of these cases as I have observed them during the past eight years: 1. There is a neurotic element which predisposes to spasm, and the spasm may be so violent that it makes extubation extremely difficult. When the tube is finally removed, this violent spasm necessitates immediate re-intubation.

2. The spasm type without nervous element. This is due to the long-continued use of the tube. The tube virtually acting as a splint to the intra-laryngeal muscles, holding them in a state of fixation or functional disuse. The abductors being held apart for so long a time the balance of power is exerted by the opposing set of muscles, and we have adductor spasms. There is no recurrent laryngeal nerve involvement, and therefore, no paralysis. The muscles show some myocytis, but to very slight degree. The nerves, both the trunk and muscular branches, are normal.

3. The polypoid type which occurs at the base of the epiglottis and ventricular bands. These polypoid outgrowths fall together as the tube is removed and immediate re-intubation is necessary. This type simulates the spasm type.

4. The hypertrophic type. The stenosis is slow and gradual. The chief site of the contraction is at the cricoid level but the entire lumen of the larynx and trachea may be involved.

5. The cicatrix type, which is due to traumatic or surgical interference.

6. The atrophic type, with the formation of thick, sticky muco-crusts which obstruct the larynx.

The primary cause of the whole trouble was due to the diphtheritic inflammation and Dr. Lynah mentioned eight cases of diphtheritic croup which had to be intubated ten days after the croup had disappeared, owing to a slow and gradual contraction of the infiltrated laryngeal mucosa and sub-mucosa.

Removal of a Foreign Body From a Bronchiectatic Cavity. By SIDNEY YANKAUER, M. D.

Dr. Yankauer said that in all the cases of foreign body which he had presented to the Section, and in fact all the cases which had been reported in literature, it was known beforehand that a foreign body had been inhaled, and the examination had been made for the purpose of removing it. In most instances it was of a familiar nature, and the operator knew what to look for, having a definite idea of what was to be expected within the bronchoscopic lumen. In other instances, the X-ray had showed the location and position of the foreign body, and in one case which he had presented some months previously, where a safety-pin had been inhaled, the knowledge gained by the radiographic picture had been indispensable.

In removing the foreign body in the case now reported, however, all of these advantages were absent, for the patient did not know that he had inhaled anything, and even when it was removed and shown to him he could not recall the accident. The radiographic picture also failed to show any shadow that could be interpreted as a foreign body.

The patient was 67 years old, and said that last December he became very hoarse, and began to cough. The sputum rapidly increased in quantity, until he coughed up large quantities, and had pain in the right lower chest; he then began to have daily chills and fevers, with sweating. He was admitted to the medical service of Dr. N. E. Brill at Mount Sinai Hospital, and a tentative diagnosis of empyema was made. The chest was aspirated but the result was negative; the Wassermann test was negative, as were also the tuberculosis tests. The amount of sputum was about 200 ccm. per day.

Dr. Yankauer said that during the last year the internists had accorded him the privilege of bronchoscoping the bronchiectatic cavities in all their cases, and he had been permitted to make such an examination in the case of this patient. The man was given a hypodermic injection of morphin and anesthetized with cocain and placed on the table; the passage of the bronchoscope was easy. Pus was observed pouring out of the right bronchus; he coughed up such quantities of pus that the suction apparatus was of no use. After this had continued for a few minutes, it ceased, as the bronchus was emptied. The bronchoscope was advanced to the bottom of the right bronchus, where something was seen with the appearance of sloughing granulation tissue. This was seized with the forceps and withdrawn, and placed on a sterilized towel. Examination of what was removed showed that it was mostly pus, with a very tiny piece of solid tissue. A second attempt produced another attack of coughing, and he again coughed large quantities of pus. The broncho-

scope was finally advanced into the lowest terminal branch of the right bronchus, the end being 35 cm. from the upper teeth. From the view obtained, it was evident that we were dealing with a foreign body, so the entire mass was this time seized and drawn up. On removing it from the mouth, the mass broke in two, but the part which dropped was recovered. The smallest piece was first removed, the second piece remained in the forceps, and the largest piece was the part which broke off and was recovered. Examination proved the foreign body to be part of a chicken bone.

The bronchoscope was then again introduced into the bronchus and a careful examination was made. There was a secondary ulceration all around the wall of the bronchus where the foreign body had lain. The patient recovered without difficulty, and twenty-four hours after the operation the temperature became normal, and has so remained ever since. Being quite advanced in age he has not made a very rapid recovery. The flatness of the chest, however, has diminished, he breathes well, is out of bed, and is steadily though slowly improving.

The case was unique in that a foreign body was found and removed when its presence had not been even suspected.

NOTE: The patient was discharged from the hospital three weeks after removal of foreign body. At that time the daily amount of sputum was 10 ccm.

Case of Foreign Body (Instrument) in the Sphenoidal Sinus. By I. M. HELLER, M. D.

To be published in full in a subsequent issue of THE LARYNGOSCOPE.

Tumor of the Hypophysis. By JOHN LESHURE, M. D.

Dr. Leshure said that that although the case belonged more properly to the Section of Ophthalmology, he thought it interesting to present it to-night, as Dr. Voorhees was to read a paper on the subject of "Hypophysis surgery," and the case demonstrated some of the features touched on by the paper.

The patient was 19 years old. There was nothing of interest in his family or personal history, except the fact that his grandmother had had paralysis agitans. He first came under observation on August 15, 1910, complaining of headache following the use of the eyes for near work, and poor distant vision. Examination showed vision 20/40 in each eye, increased to 20/15 in each eye, with a + sphero-cyl. correction. The fields were normal, and the nerve head outlines were slightly hazy. The extrinsic muscles were normal. Examination of the nose showed moderate enlargement of both middle turbinates, and the presence of muco-purulent secretion coming from the middle and post-ethmoidal cells. His symptoms were relieved for a time by wearing glasses, but he began to experience severe headaches about a year ago. Treatment of the ethmoiditis relieved this for a time, and he was not seen again until December, 1911, when he complained of inability to see objects in the right half of the visual field, and severe frontal headache. Vision O. D.=20/70; vision O. S.=20/40. There was complete right temporal hemianopsia, and a general contraction of the left temporal field, varying from fifteen to twenty

degrees below normal. Dr. Cushing lays stress upon the interlacing of the blue and red fields in some types of brain tumors, but I was unable to demonstrate this sign in this case. Both optic discs showed signs of atrophy, and the pupillary reaction to light was decidedly sluggish. All the evidence pointed to a chiasm lesion, which opinion was corroborated by an ophthalmologist and a neurologist who saw him in consultation. An X-ray plate made by Dr. Caldwell showed marked enlargement downward and forward of the sella turcica, and at the suggestion of Dr. Jelliffe the patient was referred to Dr. Cushing of Baltimore, for operation. This was followed on the tenth day by a meningeal infection so severe as to jeopardize the life of the patient for several days. After a number of injections of Flexner's serum, recovery took place.

Unfortunately, I have not yet received Dr. Cushing's notes of the case, which were promised, nor the X-ray plates, so that at this point the history is somewhat incomplete.

Several days after a preliminary exenteration of the middle turbinate and ethmoid regions, the extirpation of the hypophysis tumor was undertaken through an incision at the junction of the upper lip with the gums. A submucous resection of the septum was done, subsequent resection of the floor and roof of the sphenoidal sinus giving access to the base of the tumor, which was cystic. Mention has already been made of the meningitis which appeared on the tenth day, evidently following the dressing, and the question arises whether the oral route is not more apt to be followed by infection than the nasal route.

Two or three weeks after returning home, the patient began to suffer from frontal headaches, and returned to Baltimore for a decompression operation, Dr. Cushing believing that the headache was due to meningeal thickening and increased intra-cranial pressure. Since this last operation, the patient has been quite comfortable.

Present examination: Externally, in right temporal region is a large bulging mass, evidently the protrusion of brain and its membrane. The nose is clear, save for a small amount of granulation tisse in the region of the sphenoidal sinuses. Both septal flaps are intact. Both optic discs are slightly atrophic and pigmented on the nasal side. The temporal hemianopsia still persists, but the central vision has risen from 20/70 to 20/30. The fields have varied somewhat on different occasions. The charts made a few days ago show the condition then.

The case was purely ocular in type. Radiographs were made of different bony structures, but no signs of acromegaly were noted.

DISCUSSION.

DR. CARTER said that the two cases presented by Dr. Lovell showed very distinctly the advantages of the re-implantation of living tissue. Of course, they had been operated on in March, and were not of very long standing, and there was some question as to whether the ultimate result would be as good as at present. From what Dr. Lovell said, the deformity must have been considerable, but it is unfortunate that the doctor did not have photographs made before the operation, so that the degree of improvement could be properly estimated. One of the cases was a

homoplastic operation, the cartilage being taken from another patient and it was a question whether that would remain. The opinion of the majority of those who have done this work is that tissue removed from one patient to another is reabsorbed.

Another point is that the operation of introducing cartilage into the bridge through the nose is not new, it was done by Dr. Green of Boston, two and a half years ago; instead of using cartilage from the septum, he used it from the rib. In the spring of 1910, in Dr. Harmon Smith's clinic, he himself had used a spur from the patient's nose. In most of Dr. Carter's cases there has been no choice except to take bone from another part of the body, as practically all the cases upon which he has operated had no septum and were cases of extreme deformity, and it was for this class of cases that he devised his operation of rib transplantation.

DR. GLOGAU said that in the cases he had reported it was inadvisable to inject paraffin, as the upper part of the cartilaginous septum consisted simply of mucous membrane. He is of Dr. Carter's opinion that autoimplantation is the most logical procedure.

DR. LESHURE asked how long the tube was left in the larynx in the original intubation. He understood Dr. Lynah to say that it had been left in five days. In his own cases it had been very important that that particular time should be observed—four days and six days being ineffective. O'Dwyer found that five days was just the right period; if left in too long, it was apt to cause granulations and paralysis, and if taken out too soon it would have to be reintroduced, with practically the same result.

Dr. Lynah had spoken of the psychic element. Dr. Leshure said that he had a case of a child 14 months old who had been intubated four times, the first time for only three days, and each time the tube was replaced there was more traumatism; the second time it had to be replaced and taken out at once, and after five days it was replaced, but it was impossible to leave it out for more than an hour; the next time, two hours. During that time he noticed that if he came near the child the symptoms and dyspnea increased, due to fright, so he made it a point to have the child removed to another part of the house, and she improved; by gradually lengthening the time she improved until the tube could be left out.

DR. GLEITSMANN said that he had not seen the case when presented, but understood that it was a case of hypertrophic laryngitis. Six years ago he showed a patient to the section upon whom he had performed laryngotomy on account of a general hypertrophic laryngitis, leaving the cords intact. At the time of the demonstration the parts were healed and united, and the patient spoke with loud, but husky voice. Since then he has improved to such an extent, that he is able to teach boys.

DR. SIMPSON said that these so-called retention tube cases seem to be much more frequent than formerly, and that it would be interesting to know the percentage. It was easy to determine the secondary causes which necessitate continued intubation, but the exact primary causes have not been thoroughly determined, the type of the diphtheria and traumatism are important factors. Dr. O'Dwyer had laid stress upon those points. Dr. Simpson said that he himself did not think that paralysis

was as often the first as the secondary cause. Of course, the constant wearing of the tube would produce hypertrophic tissue.

DR. SMITH inquired how frequently Dr. Lynah removed the tubes, and whether there was not danger of producing a paralysis; he had seemed to minimize this possibility. In cases where he himself had to leave the tubes in place, the trachea had collapsed, showing that where nature's own method has been supplanted the tracheal rings lost their tonicity and failed to act. In one case he tried to leave the larynx open, but the patient refused to let anything remain in the wound, and it drew together again, and he had not been able to find any method of keeping it open. The paralysis seemed to be as dangerous as the cicatricial stenosis.

DR. SMITH said that he had seen the pugilist whom Dr. Lovell had presented on the evening of the day of the injury, and he had then a very good nose, and at the present time it seemed to be like what it was before the deformity.

He felt that in the transplantation of bone there was danger of sloughing and subsequent greater deformity, as there was danger of infection. The submucous injection of paraffin was perfectly feasible in most of these cases. It has been done successfully time and again. It is easy and simple, and does not endanger the other tissues by infection.

DR. LYNAH, referring to Dr. Smith's case, said that in chronic tracheal canulae cases, there was a polypoid hypertrophy about the canula and in the posterior tracheal wall, which completely closed the trachea with a resultant closure of the larynx above from disuse. There is no paralysis and the same condition of functional disuse of the muscle occurs from failure of air to pass through the larynx, and when treated properly the muscle will functionate and return to normal.

On intubation of a case of tracheal fistula the tube will come out of the tracheal wound, unless firm pressure is made at and above the fistula to mash out the posterior hypertrophy, and allow the tube to pass with the trachea below the wound.

He had had two cases from the Manhattan Eye, Ear and Throat Hospital. One of which developed measles and the other diphtheria. Both were admitted to the Willard Parker Hospital as chronic tracheal canulae cases, and after treatment for a month or two, both cases were able to remain without the tracheal tubes and recovered.

Dr. Leshure had asked about the length of time the tubes were worn in the acute diphtheritic stage. Much depends on the amount of antitoxin used during the acute stage. All agree that the larger dosage of antitoxin has shortened the period in the acute stage. At the Willard Parker Hospital in 1905 and 1906 it was customary to leave the tube in for seven days. The time for extubation depended upon the general condition of the patient, though each case seemed to be a law unto itself. Since 1907 the average was from two to four days. The last report from the Hospital showed that the majority was on the second to third day.

Referring to the case spoken of by Dr. McCoy, Dr. Lynah said that it was difficult to get the large tubes in, and he increased the size very

gradually—a millimeter at a time, once a week. The tubes were also changed at this time for cleansing. He did not use the metal tubes on account of calcareous deposits which formed on them, but the hard rubber tube would also become very foul if left in longer than one week. He did not consider the case referred to by Dr. McCoy hopeless, as it was of the hypertrophic type and should recover by dilatation, even though the cartilage may have been involved and had undergone bony changes with projections into the laryngeal lumen. The only way to cure such cases is to dilate them to the limit.

In answer to Dr. Simpson, Dr. Lynah said that the percentage of chronic stenosis was less than one per cent. He had been doing this work for eight years, and had not found it to increase during that period. Of forty cases which he had treated, twenty-six are well, two cases which he presented he did not consider cured, for the required years had not passed, eight had died, and the rest were under treatment at the hospital.

In answer to the second question—the reason why the tube had to go back in the acute stage—he answered, that in the severe cases in which resolution did not take place early, the subglottic infiltration which involved the mucosa and sub-mucosa in the acute stage would gradually close the lumen and re-intubation was necessary. This was the very first stage of the hypertrophic laryngitis. Secondly, that the tube acted as a splint to the muscles and caused a disuse spasm when only worn for four days. This Dr. Lynah thought explained the reason for the subacute and chronic case.

Dr. Gleitsmann said that if he understood the speaker correctly, he considered his case and one reported recently by Dr. Voislawsky to the section, the only ones on record of a foreign body in the sphenoidal sinuses. Chiari reported a case of a pistol ball in the sinus at the Vienna Laryngological Society, 1910, and Oppihofer found in 200 post-mortem cases stomach contents in all the accessory sinuses; nine times in the sphenoidal sinus.

Surgery of the Hypophysis: (Pituitary Body) With Especial Reference to the Endo-nasal Method of Hirsch. By I. W. Voorhees, M. D.

Published in full in the August, 1912, issue of The Laryngoscope.

DISCUSSION.

Dr. Douglass said that the discussion of such a paper was almost hopeless; it should be accepted without discussion. He felt some one should compliment Dr. Voorhees on the interesting way in which he had presented the subject. It was scarcely possible to discuss the subject until more of this work had been done. He had not done any, but was very glad to have his attention directed again to this important operation. For the past few months we have been reading in French and German medical literature about this operation, and from what he had heard to-night the operation was not so simple as it was reported to be. He greatly admired the charming modesty with which Dr. Voorhees had presented his work.

He could recall no case where this operation should have been performed, had he known of it. From embryological studies he had accepted the view that the hypophysis was a degenerating organ, like the appendix, and not an actively functionating one. He was inclined to think that this work in the future will not be very often done. The case against the hypophysis did not seem to be proved, and in cases of acromegaly we are not sure that that organ is responsible, though one could easily see that the organ might sometimes be at fault.

Another impression which he received from the paper was the fact that the rhinologist at last seems to be coming into his own. The early practice of rhinology consisted mainly of some laryngeal tinkering, swabbing, and partial removal of adenoids and tonsils, and a multitude of operations on the turbinates. Then the antrum was wrested from dentists, perforating ethmoid and frontal sinus cases were seized from the eye specialist, and some ear diseases were taken away from the aurist; then the field was extended with bronchoscopy and esophagoscopy, and now the rhinologist is encroaching upon the brain regions, and will be able to do some of that surgery, if it is best done through the nose. Since we have been able to get these things from the other men, rhinology is one of the live and interesting specialties of the day, and while many questions are still under debate we will always have an increasing interest in our work and feel that we are practicing one of the most absorbingly interesting specialty.

Dr. Voorhees thanked Dr. Douglas for his remarks, and said that his purpose in presenting the paper was not simply to have a chance to talk but to bring before the section something that was really new and important. As Dr. Douglas had said, there are many paths in rhinology that have been neglected, and this was surely one which very properly comes under the view of the rhinologist. The general surgeon has been doing these operations, chiefly because no other specialist has offered to do them. Perhaps the reason the rhinologist has seen such cases infrequently is that they have not come to him but have gone to the general surgeon who is supposed to be anxious and capable of doing everything that has to be done with the knife. Dr. Cushing was selected to operate upon Dr. Leshure's case because he has probably done more brain surgery than any one else in America and is thoroughly familiar with the surgery of the head and neck. He really did a sub-mucous resection from the buccal cavity. He removed the septum, preserved the flaps, went into the sphenoidal cavity, and carried out the technic that other men have performed. The entire question concerns the method of approaching the hypophysis. When the sphenoidal cavity is reached, the technic is essentially the same in all extra-cranial methods. One simply has to decide which is the better route of approach. Any man who is familiar with sub-mucous work and who performs the operation on the cadaver a few times is capable of carrying out this operation on the living. Familiarity with all the essential steps is, of course, necessary. Any one would hesitate at the first operation, but since it has to be done, the rhinologist should get into line and fit himself for the work.

(Regular Meeting, October 23, 1912.)

Case of Atresia of the Palate and Rhino-pharynx. By DR. R. C. MYLES.

DR. MYLES said he had seen a number of cases of atresia of the rhino-pharynx, many of which were cured by the Nichol's method, but this case of the boy was one of the most difficult propositions he had ever seen. There had been a loss of the lower part of the soft palate by traumatism and an adhesion extending upwards and outwards from above the faucial pillars to the Eustachian tubes. An operation, a modified MacKenty, was performed by him and two sections of the posterior wall of the pharynx were turned upward and sewed to the posterior raw surface of the soft palate. This procedure promised a good result for a few weeks. Extensive cicatricial tissue on the sides filled in and almost closed the opening. He then placed silver wire through the adhesion above the left tonsil and brought it out in the rhino-pharynx and twisted the ends together and left it in place about three months. At this time there was a corrugated mucous lining of a small aperture leading from the rhino-pharynx to the mouth; the tissue within the wire was then cut through and this produced quite a large opening as can be seen at the present time. As a safety measure, for the future, he placed a silver wire on each side through the posterior-superior margin of the faucial tonsils and carried it up in the rhino-pharynx near the Eustachian tubes, brought the ends down and twisted them together. The ends were left behind the soft palate in order that they might not irritate the tongue. In the course of several months, the wires will be removed and he hopes to present the patient for further observation.

Functional Aphonia. By DR. OTTO GLOGAU.

The patient was presented and asked a few questions but could scarcely articulate. Dr. Glogau said that she had come to his office the previous day in this condition. She was 27 years of age, and was married secretly nine years ago. Her husband deserted her this winter, and she has been employed at $5.00 a week in an apartment store. With this she has to pay rent and help support her family, and she is a good woman. She is very excitable, and every now and then has an attack of tonsillitis. She has frequent hysterical attacks, when she cries, throws herself to the floor and acts like "crazy" (as her mother says). There are no changes noticeable in the larynx; there was no specific history. The rhino-glottis presented the characteristic picture of hysterical aphonia. There was no paralysis present, but for a tenth of a second the vocal cords touch each other then open immediately and remain in a cadaveric position. No treatment had been given. The doctor said that he would welcome any suggestions for treatment. (The patient was the next day subjected to a sudden shock by the spark of a high frequency current and immediately regained normal speech. Dr. Freudenthal was kind enough to examine the patient right after this one and final treatment and he agreed that the author's diagnosis of histerical aphonia was correct).

DISCUSSION.

DR. FREUDENTHAL thought that if the acute laryngitis were treated first, quick results could be secured.

DR. ALEXANDER said that he had found static electricity of great value applied on the spine, especially the long sparks. They seem to furnish the best tonic treatment. He had had several such cases.

DR. HARMON SMITH said that he would like to bear out what Dr. Alexander had said relative to the application of the thermo-cautery. He had had occasion to see the efficacy of this treatment in several cases, but believed it was due to no virtue of the cautery or for that matter to any form of electricity, but rather to the mental effect.

He recalled one case at the Manhattan Eye, Ear and Throat Hospital where the house surgeon had used a bucket of cold water upon the patient who immediately regained her voice. He believed that these cases were of a neurotic nature and that the mental condition played a large part in the symptoms.

DR. MYLES said that there was no doubt that a mental shock was very effective in these cases. When he first came to New York a prominent practitioner had requested him to see a woman who had not been able to speak for months. He had sent a large electrical apparatus to her room, and before the consultant and himself arrived the woman had recovered her voice, and they had no opportunity to use the battery.

DR. GLOGAU said there was no evidence of an acute laryngitis. So far as the suggestions made were concerned, he had thought of the electric shock, and also of some psychic treatment, but he wished to show the patient first.

Epithelioma of the Larynx. BY DR. JOHN HORN.

Abraham W., 50 years of age, came under my observation September 11, 1912, suffering from hoarseness which had existed nine months. Could only talk in a hoarse whisper. Family history good. Wassermann reaction made twice was negative. Smoked strong cigarettes, and drank considerable alcohol.

Laryngeal examination revealed several irregular-sized, pale red papillary tumors, partly covered with a grayish mass involving the left vocal cord and ventricular band, and left side of the base of the epiglottis encroaching beyong the median line. No enlarged glands noticed. There was slight interference with respiration, but no pain in swallowing. He has had some slight bleeding when growth was rubbed with cotton applicator. A portion was excised and sent to Dr. F. B. Humphreys, Pathologist of the German Hospital, who reported as follows:

"Specimen shows malignant epithelial new growth. The epithelial cells for the most part are rather large and protoplasmic, and arranged in islands separated by a moderate amount of hyalin connective tissue stroma. In a few places in the center of these islands are found distinct epithelial pearls. Mitotic figures are not abundant. Anatomical diagnosis: Squamous celled epithelioma of larynx."

Gumma of the Larynx. By DR. JOHN HORN.

James C., 40 years of age; hoarseness off and on during the last year. He gives a history of primary infection about a year ago. Wassermann recently made was strongly positive. He received two intra-muscular injections several months ago. For the present he is under mixed treatment.

DISCUSSION.

DR. ABRAHAM said that the case seemed to be a proper one for laryngectomy, if the patient would consent to it. Of late several cases had come under his observation where the laryngectomy was performed, but the glands in the neck were not removed. In one case a second operation for the removal of the glands in the neck had to be performed within two months following the laryngectomy, owing to a recurrence of the growth in the pharynx. This case was now abroad.

In the case of the patient with the gumma, he presumed that Dr. Horn would try "606." He was confident that if a sketch were made before this treatment and again six or seven days later, the difference would be surprising.

DR. SIMPSON said that the first case presented to Dr. Horn seemed to have the appearance of the white-cotton-tuft growths within the larynx, one of which was presented by Drs. Gleitsmann and Harmon Smith at previous meetings of this Section. That type was always supposed to be malignant. Contrary to this opinion, however, Dr. Simpson had recently presented a case before the American Laryngological Association in which the cotton-tuft growth proved to be tuberculous. The entire half of the interior of the larynx on that side was excised and the patient so far had made a perfect recovery, without any return of the growth.

DR. MACKENTY thought that nothing short of extirpation would be of any avail. He is going to try the Gluck operation in these cases. This summer while in Vienna he had seen thirteen cases (where this operation had been performed) under local anesthesia. The patients stood the operation very well, but had a good deal of pain during operation. The convalescence was better than that observed under general anesthesia. Whether this work could be done in this country under local anesthesia he could not say. Marschek does a very clean operation, taking out everything from underneath and around the sub-maxillary glands, down to the clavicle so that the whole neck is dissected clean. It requires three to five hours under local anesthesia, and is a very extensive operation. Marschek says that he looks forward to better results in future.

DR. HORN said that he had not liked to advise intravenous injection of the case with the gumma until after he had shown it before the Section. He had had a similar case and was surprised to see how soon the growth disappeared after the intravenous injection.

Case of Adeno-carcinoma of the Nose. By DR. L. D. ALEXANDER, JR.

Dr. Alexander stated that the literature to date contains case reports of approximately 200 cases of primary intra-nasal carcinoma. In the order of their frequency they are: (1) squamous celled; (2) cylindrical celled; (3) medullary form; (4) adeno-carcinoma. Of the latter form records show but twenty-one cases.

Case: Female, 55 years; obstruction of right nostril for three years. Had polypi removed many times. Profuse mucoid and bloody discharge. Examination: Boggy tumour, lobulated, arising from middle turbinate and adjacent regions. Extending into antrum and frontal sinus. Bled on probing. Right antrum and frontal region dark on transillumination.

Confirmed by radiograph. Piece removed and examined by Dr. E. C. Smith who reported tissues to be adeno-carcinoma.

Operation: Incision beneath right eyebrow and side of nose for two inches. Entrance through orbital plate of ethmoid. Exenteration of ethmoid regions. Curettage of frontal sinus, sphenoid.

Antrum entered through canine fossa and curetted. No return of condition since five months.

DISCUSSION.

DR. HURD said that five years ago, (1907), he had reported a case of adeno-carcinoma of the nose involving right antrum and the entire right maxilla was removed. Two years after the operation there was no recurrence. Six months later there was a recurrence, and at the end of three years he had a recurrence in the left maxilla; half of that was taken out and six months later there was another operation, and after another six months still another operation, and the contents of the orbit were removed. The patient has now an extensive recurrence on the soft palate, and along the orbit and on the edge of what was left of the zygoma. He may live for another year yet. It was now seven years since the first operation. It was very interesting to keep track of these cases and to see how long they go before recurrence. At the first operation, Dr. Wright had reported a mild adeno-carcinoma; then from a deeper cutting he made a microscopic diagnosis of a very malignant growth, and the clinical course would put it midway between mild and severely malignant.

DR. MCCOY said that the case of Dr. Alexander interested him very much, for in February, 1905, he had presented a case of adeno-carcinoma of the frontal sinus. He first saw the man a year before doing a radical operation. The growth was twice removed intranasally, coming back very quickly. The patient suffered a great deal from headache, and submitted to the radical operation because of the pain. When the frontal sinus was opened it was found to be crowded with the growth, and a portion of the posterior wall was eroded; the growth was just about to attack the brain. This case seemed to run a rather mild course, for three years, finally spreading rapidly and quickly. At that time he had been able to collect reports concerning eleven cases. To-night Dr. Alexander had reported on twenty-one cases collected. It was not a very common growth.

The preliminary method of treatment of which Dr. Alexander had spoken, tying off the carotid, seemed excellent, as these cases are very bloody.

He had followed the case of which he had just spoken for two years after the operation, without recurrence, but had not seen him since. The man was a painter, about 47 years of age, and lived in Brooklyn.

DR. HURD said that in the different microscopical sections in the case of which he had spoken, several, made from time to time, were all absolutely identical. They did not become more malignant than in the beginning. The case was treated at one time with the x-ray for six months, without material change. Dr. Freudenthal then treated it with radium, and that seemed to make some impression on the soft palate, but did not stay the growth. At present, the case is inoperable.

DR. JOACHIM (of New Orleans) reported another as yet unpublished case. Its course extended over four years from its inception. At first it was of a very mild character, but later it became very malignant. An interesting feature from the clinical standpoint was that twice the patient had erysipelas, which seemed to have a very beneficial effect where it spread, but it seemed to go all over the head without attacking the new growth at all. The man submitted to any number of operations, and the growth spread along the lymphatics in the radius of this growth. The poor fellow had also an invasion of the frontal sinus, with exposure of the dura. It extended along the soft palate and down to the fauces. He finally died of sepsis.

DR. HURD told of another case in which the diagnosis of frontal sinus disease was made, and the patient was sent on to New York for operation. A year before, the patient had had polyps removed for frontal sinus trouble, and came under observation with a diagnosis of frontal sinus for radical operation. The nose was occluded with a very vascular growth, and the glands of the neck on both sides were involved. Dr. Wright pronounced it adeno-carcinoma from section of one of the glands. Dr. Hurd said that he refused to operate on the case, and the patient returned to Philadelphia and submitted himself to operation there, and died on the table of hemorrhage.

DR. ALEXANDER said that these cases seem rare because they are not diagnosed. Probably many in the incipient stage come under observation but are not correctly diagnosed, and he wished to make a plea for the routine examination of all polypi with the view of discovering many cases of this kind which have heretofore been overlooked.

Restoration of the Entire Nose by Rhinoplasty and Bone Transplantation. By DR. W. W. CARTER.

Dr. Carter said that the patient had been referred to him by Dr. Frank Miller. She was 32 years of age and had been married for seven years. Six years ago she gave birth to a still-born child, and five years ago had another child which is living and in good health. Family history, so far as syphilis is concerned, negative. When sixteen years of age (sixteen years ago) she had a slight catarrhal trouble in the nose, and while under treatment by a doctor developed a chancre in the nose. A little later secondary symptoms developed, and soon after that tertiary symtoms set in, accompanied by a very profuse and fetid discharge from the nose. A little later pieces of bone were expelled from the nose, and the ulceration continued until it reached the external nose; the hard and soft palates were involved, and the alveolar process of the upper jaw, destroying a large part of it corresponding to the incisor area. Her ears and eyes were also involved, and she lost the sight of the left eye. A number of years ago she was exhibited before this section as one of the most malignant cases of syphilis that the gentleman then presenting the case had ever seen.

This extensive process continued for two years, and then healed up, the nose having been completely destroyed. She received a small amount of mercury and iodid of potassium during the active stage of the disease,

but after that received no treatment at all. She has been without a nose for fourteen years.

Dr. Carter said that he had seen the patient first during the latter part of February, and at that time she had only a hole in the face surrounded by a thick band of cicatricial tissue which connected with the bone underneath. The lip was contracted, the uvula was gone and the soft palate was scarred and contracted. The inside of the cavity was filled with greenish yellow pus and she had a very offensive ozena. The Wassermann reaction was faintly positive. She was admitted to a private ward in the Manhattan Eye, Ear and Throat Hospital, and put under iodid of potassium and tonic treatment, with a private nurse day and night, as he was especially desirous of getting a good result. The operation was performed on March 20. A section three inches long without the periosteum was taken from the right ninth rib. This was split and the cancellous tissue scraped from the outer half. This was inserted between the superficial and deep fascias over the left biceps.

At the end of ten days the bone seemed to have become incorporated in the tissue; there was no reaction in the area of transplantation; so the second stage of the operation was performed. On March 30 a flap including the transplanted bone was dissected up. This flap was made nearly twice as large as was thought would be needed for making the new nose in order to allow for cicatricial contraction. This flap was sewed into proper position over the roof of what was formerly the nose, between the eyes, and the arm was bound to the head with adhesive strips. The tissue seemed to take right away, and the connection became pretty good. The upper end of the bone had been inserted beneath the periosteum, over the naso-frontal process. Three days after this operation skin grafts were taken from the thigh and grafted on the under surface of the flap. The tissue seemed to take in every place, and on April 12 the flap was severed from its connection with the arm. The flap at once became perfectly white, and in a few hours was purple or bluish, and it seemed certain that the flap would be lost. So Dr. Carter tried an expedient which he believes will save many flaps if it is tried in time. From his experience in this instance he can heartily recommend it. He applied a leech to the distal end of the flap. The suction of this stimulated the flow of blood through the recently formed capillaries at the connection of the flap with the face and the flap immediately became warm and had a good color, and there was no longer any doubt about its retaining its vitality. The leech bite continued to bleed for twenty-four hours. Dr. Carter is convinced that the flap would have been lost but for the leech. Later, several moulding and plastic operations were performed, and the result is a fairly satisfactory nose. The patient can now breath well through the new nose and her appearance is certainly very much improved. Another interesting point is that she has sensation in the nose, and she claims that this is becoming more acute.

DISCUSSION.

Dr. Frank Miller said that he had never seen a more horrible syphilitic ulcer than in this case. As could be seen from the photographs, the

ulceration was extensive, the hard palate, the septum, and everything was gone, and to-day the woman has a very good nose. He wished to congratulate Dr. Carter, and praise his skill in securing such results, for they were rare, and when a fellow practitioner does such a piece of work there can be no words of praise too high. He had watched the operation and it was performed with great precision and skill. It was well thought out, and the Doctor had won his laurels for every single step of the operation.

Dr. Harmon Smith said that he had had occasion to see the case before it was operated upon and had doubted the possibility of a successful outcome owing to the immense destruction of tissue. He had followed the operative procedures of Dr. Carter with great interest, and found no words too strong to commend the remarkable success which Dr. Carter had made in this piece of plastic work; that the ingenuity displayed by the doctor in transplanting the rib to the arm, previous to connecting the arm tissues to the remaining nasal structures and also in drawing healthy blood into what appeared to be a piece of dying tissue by means of a leech, showed peculiar recognition of the necessities incident to plastic work.

Result of Plastic Operation (With Insertion of a Celluloid Plate) For Relief of Excessive Deformity Following Killian Operation. By Dr. Gerhard H. Cocks.

The patient had had an extensive deformity of the forehead following a Killian operation upon the frontal sinus performed six months ago. The sinus was a very high and deep one; the whole bone had been removed, and the skin had fallen in over the posterior wall for an area as large as a twenty-five cent piece. Sixteen days ago the patient was admitted to the Hospital in Dr. Chappell's clinic. The skin was loosened up through the old incision, the area of cicatricial tissue over the supra-orbital arch was excised and a plate of celluloid inserted under the skin, with its lower border resting on the supra-orbital arch. The plate was previously shaped to conform to the configuration of the forehead by immersing it in hot water. The skin-wound was then sutured with silkworm gut. The cosmetic result was entirely satisfactory.

Some of the members of the section had seen the patient's deformity before operation, and consequently appreciated how bad his condition was at that time.

The size of the celluloid plate was 1½x2 inches. Its thickness from $\frac{1}{16}$ to $\frac{1}{8}$ of an inch.

DISCUSSION.

Dr. Emil Mayer said that he had understood Dr. Cocks to say that no photographs or plaster cast of the case had been made. He thought it was most important that in cases of this character the conditions as they existed before the work should be presented, so that not only those who had seen the case both before and afterward might know about it, but that it might be preserved as a record. More care should be exercised in recording operations of this kind.

Dr. MacKenty said that he had seen the case after the radical operation and that there was a very great deformity. The result as presented

was most satisfactory. The only criticism that he would make was that in using a thin plate to cover the deformity a blind space was left behind. The result was a very nice piece of work, and a tremendous improvement over the previous condition. He congratulated Dr. Cocks on his effort.

DR. CARTER said that Dr. Cocks no doubt had corrected a great deformity, but that not sufficient time had elapsed to be certain that the plate would be retained. He had studied the results obtained by introducing foreign bodies under the skin for the purpose of correcting deformities, and in almost every instance they had later sloughed out. He hoped that Dr. Cocks would show the case again later, and let the Section see the ultimate results.

DR. COCKS said that of course he did not know whether the plate would stay in situ permanently, but he certainly hoped that it would. Dr. Hartley had been using such plates for a long times in cases of epilepsy where the bone was removed, and Dr. Monroe says that he has seen Dr. Hartley cut down on these plates after a year, for a recurrence of the epileptic attacks, and they have been in good condition—no slough and no infection, everything very satisfactory.

Technic of Intra-nasal Operation on the Lacrimal Apparatus. Demonstration on the Mannikin. By DR. SIDNEY YANKAUER.

Published in full in THE LARYNGOSCOPE, *December, 1912, p. 1331.*

DISCUSSION.

DR. MYLES said that Dr. Yankauer was to be congratulated on the progress he had made in this operation. About fifteen years ago he himself had tried the operation with the same object in view, which consisted of the removal of the anterior end of the inferior turbinal and the median wall of the naso-lacrimal duct. In some cases he had secured good results, in others, failure, which was attributed to the contraction of the tissues lining and covering the duct. He had always had a great deal of respect for the outlet valve, and in operating on many cases of antrum of Highmore affection through the inferior meatal wall, he had no record of ever having closed the duct. His impression was that sometimes injury is done to the duct by probing. The mucosa of the bony canal is very soft and more caution should be used in the technic of probing.

DR. MAYER said that perhaps he could speak on this subject with experience as the larger number of these operations were performed on patients in his clinic. Clearly as the operation had been presented, perhaps none of those present had any idea of the infinite patience required, and only a manipulative genius like Dr. Yankauer could work the method so ably and successfully as it had been presented. It sounded very easy to pick out this small portion of bone in the lower end of the lacrimal sac, and it was with extreme satisfaction that he had followed this demonstration. Remembering the necessity of being exact and following the technic described, the results are all that Dr. Yankauer had claimed, for he had not only seen a number of the patients who had been operated

upon by this method, but also the results obtained which were all that were claimed by the speaker.

DR. EARLE CONNER congratulated Dr. Yankauer upon his excellent presentation. He himself has extirpated some thirty sacs by the cutaneous route and the results were not very satisfactory. In about half the cases suppuration had ceased. Dr. Yankauer's idea of resecting the bony wall and stitching the duct was certainly a surgical procedure in that good drainage was secured, and it was to be hoped that further experience would establish the value of the operation.

DR. J. GUTTMAN said that he had had some experience in extirpating the lacrimal duct and sac, and only the marvelous technic of the reader of the paper could accomplish such results as had been reported tonight. Not every case should be sent to the rhinologist with the expectation of going successfully through this very difficult and delicate operation. We should not expect these cases to be treated oftener by rhinologists than before. As a rule, it is not in the bony part of the duct but in the membrane of the upper neck of the lacrimal sac, that a man with experience most often finds the obstruction. From an anatomical standpoint, one cannot often expect to find the obstruction in the bony part It was certain that this operation would find a place and would be referred to the rhinologists, but it did not seem probable that most of the cases would be treated in this way. More often it is not the lower meatus of the nose which is responsible for this infection, but the middle meatus. Then, too, the removing of the lacrimal gland for the purpose of relieving the condition should be done in only very exceptional cases.

DR. GEORGE E. DAVIS said that he was sure that the members of the Section would appreciate the importance of this contribution and the description of the intra-nasal operation for diseased conditions of the lacrimal sac and nasal duct. In the paper the writer enumerates two advantages over the external or extra-nasal operation, or the excision of the lacrimal sac. By his technic he claims the sac and duct remain patent, and, therefore, maintain drainage and preclude epiphora and the possibility of external scar disfigurement.

Dr. Davis stated that his brother, Dr. A. E. Davis, had operated a number of these cases by another technic, originated by Dr. Mueller of Vienna. He agrees with Dr. Yankauer that these cases originate from the nasal source. Dr. A. E. Davis had probably operated on some twelve or fifteen cases of dacryocystitis with excision of the tear sac, and there was practically no trouble from epiphora, and absolutely no external disfigurement. The operation of removing the lacrimal gland to avoid epiphora is practically never called for. Under the technic described by the writer probably the results are all that are claimed, but it is not so easy or efficient as the external operation, where every step of the technic can be observed. In the external operation local anesthesia can be employed, and is made almost perfect by injection of cocain superficially, and beneath the periosteum in the locality of the lacrimal sac. Hemorrhage is controlled by adding adrenalin to the cocain injection. If, in a few cases, this method should not secure complete anesthesia, one always has ether at command. When ether is used the local hemorrhage may be

a little more severe. Moreover, with the external operation, after the technic of Mueller of Vienna, the results will be more successful with most operators than by the difficult and complicated technic of the intra-nasal operation described by the writer of the paper.

DR. GLOGAU said that he admired Dr. Yankauer's very skillful operation. He had himself for the last three years operated on cases of purulent dacryocystitis by the nasal route. He had the anterior part of the inferior turbinate removed and had the bony canal broken open by means of a curved frontal sinus probe armed forceps. The ingenious idea of Dr. Yankauer's method is the dissection of the mucous flap and the re-attachment of the latter after the operation is performed. He believes that Dr. Yankauer's method will be generally applied.

He found that in children purulent dacryocystitis was frequently combined with ethmoiditis. In one instance he opened and curetted the ethmoidal cells in a child while the lacrimal sac was simultaneously operated upon by Toti's method. He believes that at some future time all these cases will be treated by the rhinologist, as the naso-lacrimal duct is really, as Dr. Yankauer had laid stress upon, a nasal accessory cavity. In quoting the literature, Dr. Yankauer had overlooked Schirmer's work on the naso-lacrimal duct in Axhausen's textbook on Diseases of the Eye.

DR. YANKAUER said that he was not an ophthalmologist and had had no experience with the excision of the lacrimal sac, except in the cases he had seen which had epiphora afterwards. Opinion seems to differ in regard to the question as to whether epiphora follows the excision of the sac. In the last edition of Fuchs, the author states that some epiphora is found in every case; and the translator took occasion to remark in a footnote that in his opinion it did not occur at all. We must remember that excision of the sac is an external operation performed in a case of suppurative disease and the cosmetic results must be taken into consideration; and they are not always as desirable as might be wished. Some have very good results, but others are distinctly faulty. For this reason, intra-nasal operation offers a chance of curing the disease without an external scar. He admitted that it was a difficult operation, but like the submucous operation, the first case took three hours for its performance, the last three-quarters of an hour. It only requires a little practice for anyone to be able to do it, just as everyone is able to do submucous resection at the present time.

Gout of the Salivary Glands. E. DEGLOS, *Presse Med.*, Feb. 10, 1912.

Deglos reports several cases. The affection is not rare, but at times the source of pain and cause of trouble is not discovered. ED.

THE PHILADELPHIA LARYNGOLOGICAL SOCIETY.

Regular Meeting, June 3, 1912.

PRESIDENT DR. ROSS HALL SKILLERN IN THE CHAIR.

Submucous Resection of the Nasal Septum. By W. L. BALLENGER, M. D., of Chicago; (by invitation.)

In the submucous resection of the nasal septum we must first have a reason for operating. We do not operate simply because the septum is deflected. Many deflected septums do not produce pathological results in the nose. Operations should only be necessary when those deviations obstruct the respiratory portion, especially the upper respiratory portion of the nose. The deviations which do the most harm to the patient are those not in the lower nasal chamber, but those formed by the bridge of the septum, and those above the vomer, which are in the region of the middle turbinate body. The respiratory tract of the nose is not in the lower portion, but in the upper portion of the nose. The vomer may be deviated so as to touch the inferior turbinate, or may extend forward into the vestibule far enough to partially obstruct the inspiratory current of air, and thereby produce rarefaction of the air posterior to the obstruction. This obstruction should be removed. The same is true of anterior angular deflections of the cartilaginous septum. If the deviation is higher up, in the region of the middle turbinate, it interferes with ventilation and drainage of the accessory sinuses, namely the frontal, anterior ethmoidal and the maxillary sinuses. The lower deviations cause what is known as turgescent rhinitis. The sinuses need to be drained and ventilated, and if there is any obstruction preventing this drainage and ventilation it should be removed.

Technic. Local anesthesia. This operation should not be a long procedure, in fact I take 20 minutes for the submucous resection. Some operators take two to three hours. This is hard on the patient and hard on the operator. There are certain little tricks to make the operation short, and I will try to explain these to you.

Cocain anesthesia is preferable, though a general anesthesia may be administered. The method of applying the cocain is important. Powdered cocain is used instead of solution. A delicate silver cotton wound probe is moistened in adrenalin solution, the excess squeezed from it, and then I dip it into the powdered cocain. The loose granules are then gently knocked off, and the probe is introduced into the nose, and the entire nasal septum gone over, every portion can be reached with this flexible probe. The first application is not pleasant in some cases, but as the subsequent applications are made it will not be so uncomfortable for the patient. After the first application I wait about five minutes, introduce the probe again, wait another five minutes and make another application. Three applications in all. This usually completes anesthesia. The advantages of this method of applying cocain over the use of solution are

the speed with which anesthesia is induced and the comparative infrequency of cocain toxemia. By this method little or no cocain is swallowed, whereas when the solution is used the patient tastes the cocain and this produces toxic symptoms.

The Incision. The choice of the location of the incision should depend upon the character of the location of the deviation. We use the Killian or Hajek incision. I recommend the incision being made on the left side, as most operators are more dextrous with their right hand than with the left. The tip of the index finger of the left hand should be introduced into the nasal chamber to exert counter-pressure when the incision is being made. The incision should only extend through the mucous membrane and perichondrium. This step of the operation is most important, and if the elevation is properly done over the entire area of the deviation on both sides of the septum the subsequent steps are comparatively easy. In cases where the cartilage, perpendicular plate of the ethmoid, and the vomer are involved, the membrane should be elevated over almost the entire area of both sides of the septum. If the cartilage of the septum is only affected, the elevation should be extended about one-half inch beyond the junction of the cartilage and the perpendicular plate, and down to the floor of the nose. Always elevate at least one-half inch beyond the area of the tissue to be removed, as otherwise the membrane may be injured in the process of removing the deviated portion of the septum. The technics of elevating the muco-perichondrium may be accomplished in various ways. Some operators use the small, thin elevators. Curved elevators are also used to work around the curved portions of the septum. I, myself, use a heavy, broad, dull elevator. The chief reasons for using the blunt, heavy elevators is the greater speed and the lessened liability of tearing the membrane in the process of elevation.

To start the elevation a sharp or semi-sharp elevator should be used, care being exercised to get beneath the perichondrium. If the elevator penetrates between the mucous membrane and the perichondrium, the surface of the cartilage will present a velvet-red appearance, as the perichondrium is still covering it. If, however, the elevator penetrates beneath the perichondrium the exposed cartilage presents a glistening white surface. If this is properly done the remaining elevation is comparatively easy. Having started the elevating, insert the blunt elevator into the small pocket already made. Direct the elevator parallel with the ridge of the nose, as this is the direction of least resistance. Having introduced the elevator almost to the cribriform plate the elevation should be continued backward and downward with the whole length of the shank of the elevator within the pocket of the membrane. By using the tip of the elevator perforation is more liable to occur.

After introducing the heavy blunt elevator as high as the cribriform plate, exert pressure downward and backward with a twisting motion, and as a rule the membrane will strip down to the crest of the vomer in two or three seconds. If the cartilaginous portion of the septum or perpendicular plate is convex the operator should remember that these portions of the septum are thin and flexible; being so they may be forced

with the elevator to the median line and thus temporarily rendered straight. While held in this straightened position the shank of the instrument is passed downward and backward elevating the membrane as it proceeds. The tip of the nose is flexible, and the instrument should be held parallel with the anterior portion of the cartilage until it reaches the crest of the perpendicular deviation. The instrument should then be shifted until it is parallel with the cartilage posterior to the crest. The flexibility of the tip of the nose makes this possible, or the crest may be forced to the concave side, thus rendering it straight and the elevation continued.

The periosteum is not reflected uniformly over the bony portion of the septum. It is only where bone unites with bone, and where the perpendicular plate of the ethmoid unites with the vomer, that the periosteum is continuous, and where the vomer unites with the cartilage of the septum; the periosteum is not so continuous with the perichondrium of the cartilage. In the latter region the periosteum arises from the floor of the nose and passes upward over the lateral surface of the vomer to its crest, over which it is reflected, and then passes downward over the opposite lateral wall of the vomer to the floor of the nose.

Removal of the cartilage. I use the swivel knife to remove the cartilage. I presume you are all familiar with this method, as it is an old one. Always leave enough along the bridge of the nose for support. It is quite essential not to remove too much.

Removal of the perpendicular plate of the ethmoid. This is accomplished by the Jansen Struycken forcep, introduced through the perichondrium pouch, the perpendicular plate is seized and gently rocked until it is disconnected from its attachments.

Removal of the vomer. The muco-perichondrium is elevated from the concave side and if possible from the convex. A dove-tail Hajek chisel is introduced close to the floor and with a few blows of the mallet the vomer is separated from its attachments to the superior maxillary and removed with a pair of strong forceps.

Dressing. As a dressing I use Simpson's sponge tents. The muco-perichondrium is first clamped together with a speculum, and then two of the sponge tents are inserted into the nostril of the convex side, and one into the nostril of the concave side, and a few drops of peroxid of hydrogen instilled into the ends of the tents, the tents swell and consequently cause the two mucous surfaces to adhere together. I only allow this dressing to remain in the nose twenty-four hours.

DISCUSSION.

DR. WM. A. HITSCHLER (opening the discussion): Submucous resection never appealed to me until I saw Dr. Ballenger perform it. I recall a case two years ago in which there was considerable difficulty for me. The cartilaginous portion of the septum was removed, but the perpendicular plate of the ethmoid was exceedingly deviated, being pressed firmly against the lateral wall of the nose. I find that in using the blunt elevator saves time and difficulty. Occasionally there are deviations of the cartilage beginning at the crest of the vomer.

DR. E. B. GLEASON explained in detail his operation for the correction of deflected septums by the U-shaped flap.

DR. O'REILLY called attention to the incision known as the Freer incision, which consists of making a cut through the cartilage, either anteriorally or posteriorally to your original incision through the muco-perichondrium, as this obviates the danger of perforation, should the operator's knife go through the muco-perichondrium of the opposite side, as the incision will then not be opposite one another. Therefore, a permanent perforation will not result.

DR. MACKENZIE spoke of the difficulty of denuding the muco-perichondrium on the concave side of the vomer, and of the advisability of making a slight incision along the crest of the vomer, then denudation can be accomplished with ease. An incision can also be made on the convex side, not opposite, but anteriorally or posteriorally to the incision of the concave side, in order to facilitate the escape of blood. He also spoke of the advantage of using Schleich's method not only for its anesthesia, but by causing pressure, which assists materially in the rapidity with which the muco-perichondrium is denuded from the septum.

DR. BALLENGER was questioned in reference to sinking in of the bridge of the nose after submucous resection, and in reply he stated that he had only seen one case of sinking in, and that was a case following perichondritis. It is always best before operating to make a thorough examination, and when you find the nose flabby and soft, operative procedures should not be taken, as there is more or less danger of sinking in of the nose.

Dr. Ballenger was also asked about the correction of deviations of the septum in children, and in answering stated that he did not advocate submucous resection in children, as the cartilage in children is not fully developed, but that in correcting deflections in children he used the developed, but that in correcting deflections in children he used the Sluder operation, which consists of making three parallel incisions middle incision to extend the whole length of the quadrilateral plate.

Some Experiences with Radium. G. S. RYERSON, *Can. Med. Assn. Jour.*, Aug., 1912.

Summing up the result of an experience of three years, and after discussing the strength, duration of applications, amount of filtration, and age of patient, the writer finds that cases in which the mucous membrane of the mouth is the site of disease do not, as a rule, do well, that the tongue is doubtful, and the larynx uncertain. In two cases of lupus vulgaris of the nose, and in tuberculous glands of the neck in young persons, where no breaking-down has occurred, the results were good. The writer is convinced that radium is a therapeutic agent of permanent value. G. WISHART.

BOOK REVIEWS.

Die Neue Wiener Klinik fuer Kehlkopf-und Nasenkrankheiten. (The New Vienna Clinic for Laryngeal and Nasal Affections.) Von Prof. Dr. Ottokar Chiari and Prof. Otto Kahler, Vienna. Pp. 48, with 40 illustrations in the text and 5 plates. Urban and Schwarzenberg, Berlin, 1912. Price, M. 1.50.

The readers of The Laryngoscope will be interested in this detailed description of the new nose and throat clinic of the Wiener Allgemeinen Krankenhaus as presented by Profs. Chiari and Kahler.

All of the new features of the reconstructed nose and throat department of this enormous clinical institution are carefully detailed, the splendid new buildings and equipments illustrated, and in an interesting introduction a brief history of the establishment and the evolution of this institution is offered. It is a monument to progressive laryngology, a Mecca for the post-graduate student, and an example of scientific strength and clinical energy to the entire medical profession.

Beitraege zur Thrombosefrage. (The Thrombosis Question.) Von Drs. L. Aschoff, O. de la Camp, B. von Beck, and B. Kroenig. Pp. 99. Verlag F. C. W. Vogel, Leipsig, 1912. Price, M. 5.00.

This is a collective monograph of papers on thrombosis presented by Aschoff, de la Camp, von Beck, and Kroenig at the meeting of the "Deutsche Naturforsche und Aerzte" in Karlsruhe in 1911.

The question of thrombosis is presented from its various viewpoints—its patholo-anatomical, surgical, clinico-medical, and gynecolo-obstetrical. Aschoff reviews tersely the origin of thrombosis and the evolution of the various theories concerned with it; Beck presents the surgical section; de la Camp considers the question of coagulation in its relation to thrombosis as a most important factor; Kroenig emphasizes infection as a factor in the production of thrombosis, especially in its obstetrical and gynecological aspects. This phase of the question can be substantiated by many observers from an otological point of view as well.

This monograph is a valuable contribution to the literature of thrombosis, and should be of especial interest to all who are following up this interesting question.

Traite de Laryngoscopie et de Laryngologie Operatoire et Clinique. (Laryngoscopy and Operative and Clinical Laryngology). By Th. Heryng. Pp. 523, with 155 illustrations. Masson and Co. Paris, 1912.

Heryng's book is introduced to the profession by a very flattering preface by Dr. H. Luc. After a short introduction on the anatomy and physiology of the larynx, the book is divided into four chapters: (1) Method of examination. (2) Non-operative measures. (3) Operative treatment. General infectious processes affecting the larynx. It cannot, therefore, be called a second edition of the German book by the same author, published in 1905. The present edition is on a much larger scale; eight new subjects having been added. The first chapter on the methods of examination as well as the following ones on non-operative and operative treatment are written in the same exhaustive and at the same time concise style we are accustomed to in Heryng's writings. All the different methods, from the original examination with the laryngeal mirror up to the latest ones are fully stated, the various illuminations in usage, Kirstein's autoscope, tracheoscopy and bronchoscopy are described.

Considerable space is given in the second chapter to inhalations, the different types of apparatus, especially the ingenious devices described by the author the first time in the *Berliner klinische Wochenschrift*, Nos. 11-12, 1906. His thermo-regulation and thermo-accumulation permit the inhalations of solutions of any density or temperature. Gargles, laryngo-

tracheal injections, insufflations of powders, local laryngeal applications with directions for their use, treatment by electricity, galvano-caustic, electrolysis, massage, and lastly very useful remarks on hygiene and diet close the chapter.

As we expected the third chapter, the operative treatment, is the most valuable one of the series and the subject is handled with the accuracy and persuasive force we notice in Heryng, who from the time of the publication of his book "Curability of laryngeal tuberculosis," in 1887, has striven indefatigably by his writings and demonstrably at medical congresses to convince the profession of the correctness of his views and the good results obtained.

At the same time Heryng is liberal and far-sighted enough to appreciate the good effect of galvano-cautery applications in tuberculosis and the article on galvano-caustic and surgical treatment is the first critical study and comparison of both methods. The monograph treats of anesthesia, anti-sepsis, instruments, complications in operations, after-treatment, and contains chapters on artificial epiglottes and laryngostomy. It closes with extra-laryngeal operations.

The fourth chapter includes syphilis, actinomycosis, rheumatism, gout, influenza and skin diseases. GLEITSMANN.

Die Ostitis Chronica Metaplastica der Menschlichen Labyrinthkapsel (Otosklerose, Stapesankylose, Spongiosierung der Labyrinthkapsel). VON DR. PAUL MANASSE, STRASSBURG. Pp. 76, with 20 illustrations on 13 plates. Verlag J. F. Bergmann, Wiesbaden, 1912. Price, M. 8.

In this comprehensive monograph Manasse gives a detailed description of his report on nine cases of otosclerosis as demonstrated at the meeting of the otological society in Basle, and on a tenth case recently observed by him. The author considers every fact in common to all the cases, and emphasizes all the features in the individual cases.

The microscopical findings in each case are especially minutely described, and form an important feature of the monograph on which Manasse basis his conclusions.

The author advances the theory that this disease of the bone in otosclerosis is recognized by the fact that a portion of the labyrinth-capsule loses its normal structure and that a new form of osseous tissue takes its place. This change in the bone-structure usually begins about the anterior lower border of the oval window and progresses to the rest of the capsule, stapes, and round window.

This process begins less frequently at other points; occasionally in the area of the fenestra rotunda and in the porous acoustica interna. The extension or spread of this process varies.

Manasse emphasizes the importance of these histological changes in the osseous labyrinth and accounts for these variations by the difference in the ages of the several patients and the degree of the intensity of the process.

These differentiations in the histological section are carefully and logically analyzed, and the author finally reaches the conclusion that the different types of so-called otosclerosis are, perhaps, varying degrees of changes in the character of the bone-structure of an inflammatory type.

The author leaves as an open question the relation of changes in the soft structures in the labyrinth, such as atrophy of Corti's organ, atrophy and growth of the fibrous tissue of the delicate nerve-distribution in the cochlea and gangiion spirale on the one hand, and changes in the bony labyrinth on the other.

The greatest value that Manasse's work presents is the splendid histological differentiation that he so accurately describes, especially the changes that take place in the bone-structure of the labyrinth-capsule.

This work is also of much aid to us in differentiating typical otosclerosis, or as it should be more classically termed, "ostitis chronica metaplastica of the labyrinth-capsule," from ankylosis of the stapes, which the author terms an accidental pathological association.